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ABSTRACT

The PEACESAT Project (Pan-Pacific Education and Communication Experiments by Satellite) is an international education experiment involving institutions in 12 nations of the Pacific basin. Begun in 1969 and in full operation since 1971, the project experiments with the application of communications technology and new methods of operation especially designed for health, education, and community services. This report describes the social applications of PEACESAT. Some of the applications include intercultural exchange, dissemination information for agriculture, teaching law by satellite, solving community problems, and anticipating potential medical and health problems. Guidelines for using the system are included along with a chronology of the project. (RB)

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PEACESAT PROJECT

Social Applications

Early Uses of International Two-Way Communications by Satellite for Social Development

Report Two

October 1975 • University of Hawaii
Honolulu, Hawaii

CS 501 295

PROJECT DESCRIPTION

The Pan Pacific Education and Communication Experiments by Satellite (PEACESAT) is an international educational experiment involving institutions in twelve nations of the Pacific Basin. All are linked by communication satellite for information sharing.

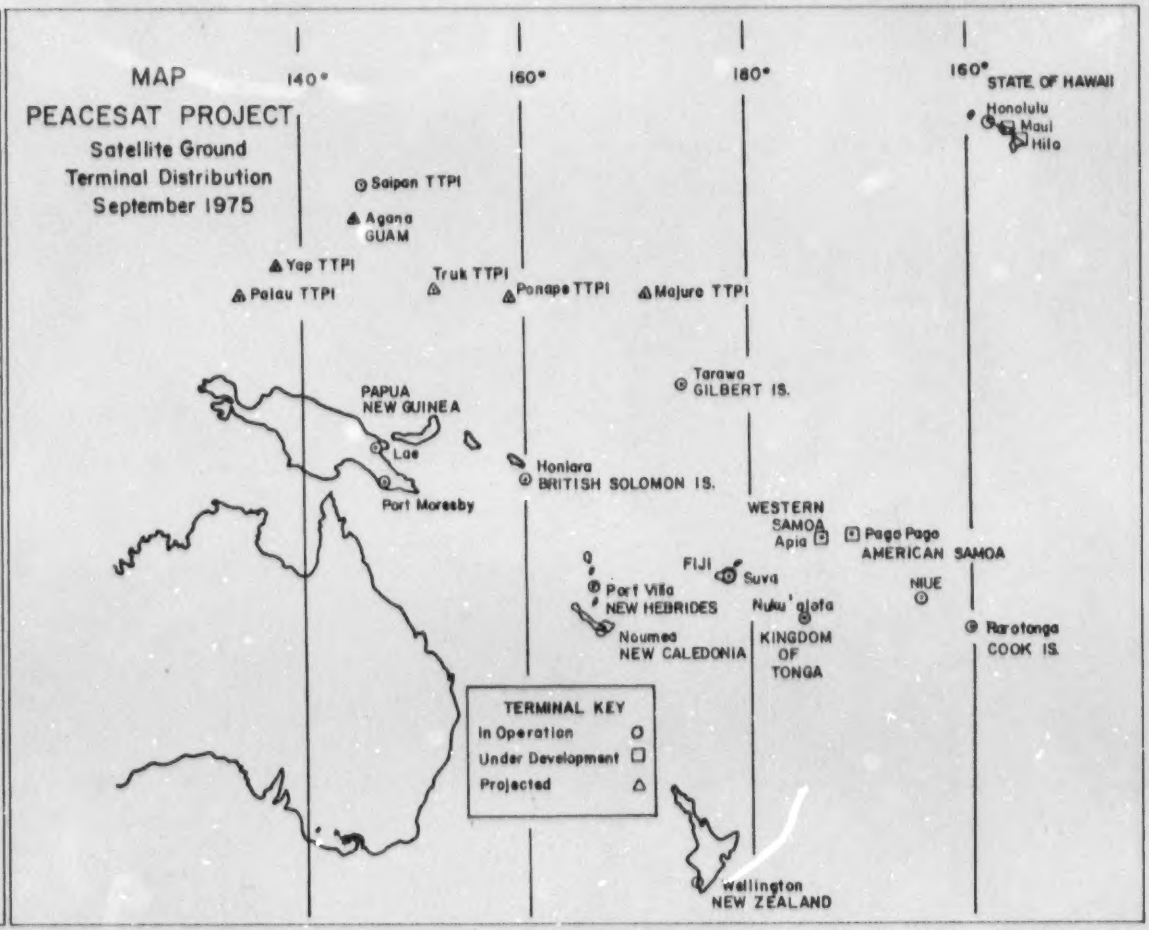
The purpose is to experiment with the application of communications technology and new methods of operation especially designed for health, education, and community services. Attention is focused on interaction among societies and requirements for social developments. The project began in 1969, and the experimental system has operated regularly since April 1971.

The PEACESAT system is a new arrangement of communications technology that is extremely flexible permitting conferencing among many locations over great distances. Needs are met and purposes served for which existing communication systems are not designed. The NASA ATS-1 satellite is a central relay point linking small ground terminals that are located as determined by the purposes and operations of the social services.

These terminals, which can be set up quickly, are designed for two-way communication. When associated with related equipment, communication may be by voice, teletype, wired blackboard, computer, and still pictures. TV motion pictures are not included because of the extremely high costs involved and the project emphasis on two-way communication from all locations.

The system users prepare all exchanges. There is no "software." Dialogue dominates. Local institutions arrange for capital and operating costs of the terminals, which are licensed by local national authorities.

We believe that the application of the satellite in this way to support social services has great potential internationally. It can provide immediate assistance to the less-developed areas of the world. At the same time, it can contribute world-wide to the advancement of science, the strengthening of culture, an increased flow of information, and more effective health, education, and community services.



ON THE FRONT COVER

Drafting of a new constitution was in progress when these Micronesian students at the University of Hawaii used PEACESAT to converse with delegates to the Micronesian Constitutional Convention at Saipan, 4000 miles away. November 1975.

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INTRODUCTION

Since the first exchange by satellite in April 1971, the PEACESAT Project has set in motion a large amount and variety of international communication activity. Experimental dimensions have involved new technology, new organizational methods, new communication formats, and new approaches to meeting objectives by health, education, and community services. There have been over 3000 hours of structured communications among people, usually strangers, separated geographically but with shared objectives. This totals 75 forty-hour weeks of experimental communication by social services.

With this series of publications we share with you some of what has happened. For the most part, materials included are from the viewpoints of users of the PEACESAT system. They were not originated for publication. A number are condensed from oral transcriptions. The authors became involved in the project to serve social objectives such as better health, education, food, or safety. The system was merely a tool for their work; they were not encouraged with reimbursements from project funds. Their primary interest, plus disinterest in the success of the PEACESAT Project, gives special value to the observations.

The U.S. National Aeronautics and Space Administration provided the satellite time, but all activity on the ground has been initiated locally, usually resulting from the work of a dedicated champion. The participating institutions own and operate all ground terminals. This dependence on local initiative is entirely different from other educational satellite projects. Later projects have operated at budget levels ten and even 100 times larger. In all, less than $400,000 has been spent over five years for capital equipment and operations, none of it from Federal sources. As a result we feel we are better able to determine the will of these institutions to engage in international communication. Since local effort is involved, commitment to the project is an indication of the value placed on activities by those closest to the scene, the participants.

In the long run, the world depends on the ability of its trained manpower to solve problems. We believe every effort should be made to provide them with the information tools necessary to the decisions they must make. The purpose of the PEACESAT system is work rather than entertainment. It is not to be confused with the mass media or with the common carrier of messages. It is designed to assist social services working for better health, expanded educational opportunity, and community development.

These services demand teamwork, often among widely separated persons, and this requires telecommunications. A system, like this experimental one, could provide for world conferences of scientists, specialists, and political leaders. The educated manpower of the world can be brought close together, closer to needed data and to information stores.

Equally important, the system can conquer the rugged terrain, jungles, deserts, and great expanses of water that divide peoples. Life in the less developed areas of the world can be especially improved by communications supporting the difficult tasks of providing better health, education, and community services.

Our objective is to obtain the greatest social benefits at costs that are low enough to be supported ultimately by conventional organizations within current budget levels. Low operating costs are necessary if small nations and social organizations are to be in control of the system and its use.

But, in fact, will agencies use the resources if available? The project and the experiences reported in this series of publications help to provide an answer to this question.

"This idea appeals enormously. I've always felt that shared knowledge is increased knowledge and by this system you are making shared knowledge even more widespread and so increasing its value at both ends of the link."

Sir Arthur Porritt
Governor General
New Zealand
PEACESAT
June 26, 1972

"PEACESAT, a product of local initiative, expresses a great American ideal by facilitating open communication between peoples on a basis of equality. It applies a brilliant technological achievement to the task of peace, dialogue between nations, and improvement in the human condition."

John Burns
Former Governor
State of Hawaii
June 1971

The users work within modest, even humble, surroundings. Each educational institution participating in the project has an exchange center operating part of the day. An operator handles the equipment generally while a terminal manager has responsibility for community relationships and the development of exchanges.

A conference on the system requires several steps. It is an important rule that no request is scheduled without the active involvement of two locations; someone has to agree to participate. Exchanges are usually preceeded by several scheduled planning sessions. There is no labor saving (and costly) "software." The very existence of the exchange is evidence of a felt need to communicate.

As projected, a full-scale exchange center at the participating institutions would provide all mediums of communication except for television motion pictures. We regard voice, teletype, and facsimile equipment as a desirable minimum. In addition, two-way exchange by computer, blackboard by wire, and televised still pictures are possible with

"Our forefathers traded in canoes. Hundreds of years later I'm talking to you through a satellite. But the message has not changed. We are friends. We are neighbors. We have a distinctive history and background and we can best protect our interests and further our aspirations through regional cooperation."

Michael Somare
Prime Minister
Papua New Guinea
PEACESAT Transmission
September 14, 1975

"I have been privileged to participate in PEACESAT exchanges both from the Saipan terminal and from Honolulu, and I must say the whole concept of PEACESAT is an exciting one. One which I feel holds great promise for Micronesia as the experiment continues, and I hope expands, to permit participation from all districts of the Trust Territory."

Edward E. Johnston
High Commissioner
Trust Territory of
the Pacific Islands
August 1973

peripheral equipment which may be leased or purchased today. Because of our limited funds, only voice and facsimile have been used in the activities described in this report.

Some medical and education exchanges have taken advantage of ground terminals located in Alaska and at the National Library of Medicine near Washington. These exchanges clearly illustrate the wide area which can be included in cooperative arrangements as a result of the capability of a satellite such as NASA's ATS-1. This satellite has two characteristics essential to the experimental system. First, its beam extends over a wide area, from the Arctic to the Antarctic and from the East Coast of the United States to the Western Pacific, one third of the earth's surface. Second, it has a sufficiently strong power source to permit low-cost ground terminals that send as well as receive. The ATS-1 shares these characteristics with only one other satellite. Both are experimental weather control satellites, not communication satellites, and the opportunity provided for the PEACESAT type of low cost ground terminal was not part of the satellite's original experimental plan.

Limited financing has meant that we have been unable to get the most out of the ATS-1 opportunity. We have not carried on a number of important experiments, or adapted and tested some kinds of equipment; and we have lacked sufficient system management for best results. However, the project has survived, the only continuing educational satellite project in addition to being the first. PEACESAT is a cooperative project in the fullest sense. Several hundred organizations have been involved, providing personnel, funding, services, operating authority, and the experimental exchange activities.

FIRSTS

- First extended experiment in the application of satellites to education (April 1971);
- First intrastate satellite network in the United States (April 1971);
- First course for credit to be taught by satellite (May 1971);
- First use of a satellite for library networking (June 1971);
- First international education satellite network (December 1971);
- First regional satellite system (January 1972).

Four years of action with this rudimentary system has provided justification in our opinion for an extended experimental project, under conditions which would permit effective long range planning. More locations should be involved over a wider area, including Asia as well as the Pacific. Taking advantage of experience, equipment and operations could be improved and adapted to the needs of the social services.

These reports and others to be published as interest warrants and funds permit will give some insight into current experiences in international communications.

John Bystrom
Project Director
University of Hawaii
November 1975

EXPANDING COMMUNICATION

The PEACESAT system is designed to assure equal opportunity among communicators. In this instance, equal means that nothing in the technology gives an advantage to one group of users over another. The rules of operating should permit initiatives from all sides.

This two-way system may be contrasted to a satellite communication system that transmits television motion pictures. The satellite ground terminal and related studio equipment necessary for sending TV messages is extremely costly and beyond the means of many national states. Large audiences and a large number of ground terminal receivers are necessary to justify the costs of these few sending locations. The result is that the large centers of population, where there is the capital and the know-how, have a great advantage over the less developed areas which become only receivers of programs. A satellite TV system is well suited to encroachment by one group on another, what has been termed "cultural imperialism."

Carol Misko, Terminal Manager at the University of Hawaii, discusses the issue in this excerpt from a paper prepared for the International Communication Association.

EXPLORATIONS IN INTERCULTURAL EXCHANGE BY SATELLITE

Carol Misko
Terminal Manager
University of Hawaii

Beginning in the 1960s, the jet aircraft increased the incidence of travel, and the application of satellites and underwater cables for telecommunication began to link cultures in two-way oral communication. As a result, communication flow among cultures is increasing.

From the viewpoint of the less-developed areas, increased communication carries with it the danger of cultural destruction, with industrially powerful nations overpowering the land and water-based cultures. What are the social consequences of intercultural communication to small nations? Is there a danger that gradually the less-industrial cultures will be destroyed?

Facilitators and constraints to intercultural communication favor the great industrial nations and place agrarian societies at a disadvantage.

- The high cost of telecommunication technology discourages use by less industrial nations.
- Telecommunication service planning and operation are geared to serve the industrially advanced nations, which are already better equipped to meet social requirements.
- The societies that develop the technology for communication also tend to control its application.
- The languages of the industrially powerful nations are the medium of exchange in international communication, lessening the status and power of the minority dialects and languages.
- The prepared media materials used by the large telecommunication systems are almost totally the product of the industrially powerful and reflect and advocate their attitudes and behavior.
- Legal forces--such as those embodied in copyright laws and spectrum management--consolidate and perpetuate the control of message content by the industrially powerful.

The PEACESAT Project was initiated with the purpose of righting, to a degree, the imbalance between the industrially

strong and the industrially weak. Initially, through the INTELSAT system, satellite technology was applied to link the major industrial centers of the world--the Tokyos and San Franciscos. The PEACESAT experiment was designed to test a system that supported the needs of the less-populated and less-developed nations while building in protection from cultural imperialism.

Among the important characteristics of the experimental system were to be these:

1. The communication capability was to be essentially equal at all locations--large centers as well as small.

2. Ground terminals were to both send and receive messages.

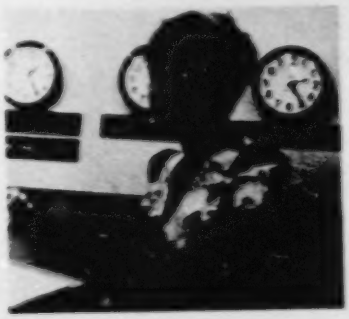
3. Terminal and operating costs at each location were to be kept low to allow for purchase by the smaller institutions and nations.

4. Each location was to own and operate its own equipment. This meant that they kept their hand on the switch.

5. Prepared "software" was to be limited.

6. And, of great importance, access to the system was to be determined by the receiver. No one was to be scheduled unless the receiver agreed.

Experimental planning and development is approached multilaterally with the full involvement of all areas. A constant searching function is carried out to determine the communication requirements of the user nations. Education, health, and community development needs are considered. In this manner, the communication requirements shape the application of the technology, not the reverse.



Carol Misko, Honolulu
Terminal Manager
July 1975

INCREASING FOOD

More effective food production strengthens national economies while combating hunger, the problem for a third of the world's population. The Cooperative Extension Service at the University of Hawaii, along with its International Agricultural Training Program, has been involved in PEACESAT exchanges since 1971. The monthly exchanges have covered a variety of topics such as poultry problems, pasture management, and the use of radio in extension work. An agricultural information transfer experiment is being initiated in 1976 and will involve agricultural information personnel from many countries.

PEACESAT FOR AGRICULTURAL USE*

Dale Goodell
Associate Director, Cooperative Extension Service
University of Hawaii

The College of Tropical Agriculture first began experimenting with satellite communication in 1971 when we held audio discussions between the Manoa Campus and the agricultural staff on the Hilo Campus.

In July of 1972, we first began considering an expanded program to include New Zealand, Fiji, Tonga, and American Samoa. In the fall of 1972, we had what we called the "Waimanalo Special"--an exchange conducted at a field day held at the Waimanalo Branch Station. Lieutenant Governor George Ariyoshi extended greetings to terminals in the South Pacific, and they in turn responded. The regular seminar portion was filled by Dr. James Gilbert, vegetable breeder; Dr. James Brewbaker, geneticist working on new varieties of corn; and Warren Yee, Extension Tree Crop Specialist--all of whom talked to counterparts in New Zealand. As I recall now, the phone patch we used out there was a brand new gimmick for most of us; hence, we treated it like a new toy. Nevertheless, when we got into the subject matter, the specialists at both ends of the conversation were obviously so interested in their work and got so involved in questions and answers that they could have gone on for four hours. This pointed up

*Presented by Dale Goodell, Associate Director, Cooperative Extension Service, University of Hawaii, at Users of PEACESAT Conference, East-West Center (Honolulu), April 29, 1975.

one of the first cardinal rules that we learned: namely, "keep the subject area narrow and concentrated because discussions will always take more time than you think."

In those early days, we were continuously too ambitious about how much we thought we could cover. We were trying out various types of subjects:

1. Extension education organization
2. Extension methods
3. Various kinds of agriculture production subject matter from beef breeding to vegetable crop production

I recall one of the early sessions where at the last minute I replaced one of our livestock specialists on a session concentrating on beef cattle. I was worried about participating because I had not prepared myself and, frankly, had been out of the field of beef cattle production for many years. It turned out that I got started talking and practically "hogged the show" not allowing sufficient time for other participants to respond. This brought home to me the second universal truth: namely, "keep your comments short and to the point and leave more time for others to talk. Develop the art of listening to a higher degree."

It was also in one of these earlier sessions that we were given a glimpse of some of the dramatic service that can be performed by this system. We had just started when the word "break, break, break" came through, and Carol Misko, our technician, immediately took over. With the help of a phone patch, a young man in a far-distant, isolated, and snow-bound valley in Alaska talked to a medical specialist on the staff of Straub Clinic here in Honolulu for advice about a patient. It turned out that the young lady had what appeared to be convulsions and seizures. At one point, the doctor said he should administer a drug immediately. The young man replied that he didn't have the proper medication on hand. The ending of the story included the relaying of messages through the Honolulu Coast Guard to the Coast Guard in Juneau, Alaska, which dispatched a plane to pick up a doctor 150 miles away from the patient and fly him into the valley to help the young man out. We lost our turn at PEACESAT that afternoon but felt that the time had been valuably used by other people.

At the end of the 1972 year, W.R. (Dick) Dale, Chief Advisory Officer in Wellington, New Zealand, and I at this end compared notes, with the idea of preparing a short and simple evaluation paper for our first year of operation. We worked out a few general ground rules which would be tried in the second year. Along with the two "universal truths" mentioned above there were other ideas:

1. It seemed necessary for one person to accept the role of session organizer who would be expected to

circulate a facsimile of the proposed discussion material in advance of the proposed seminar.

2. Presentations would be run through ahead of time and all extraneous or irrelevant material would be removed in order to save time.
3. We agreed to rotate the additional responsibility from one seminar to the next between Hawaii, Fiji, and New Zealand. Actually, as the next year got underway, new stations joined us, and we broadened the responsibility. We agreed on a series of seminars covering various agriculture technology fields for the next year. The first one was beef production, and we conscientiously narrowed this topic down to artificial insemination, herd improvement records, and something else, which now slips my mind. When it came time for the session, we found that we just barely opened up the field of artificial insemination and we never touched the other two topics at all except in passing at the very end of the hour. Again we vowed to narrow our field.

The second year was spent covering such subjects as beef production, plant pathology, entomology, poultry production, and port quarantine. It was during this year that the people in New Zealand began experimenting with the use of phone patches to sub-stations some distance from the terminal.

Also during this second year, when our enthusiasm was building, we were spending most of our time trying to prove to NASA that PEACESAT should not be terminated.

In the 1973 program year, we had begun to work out the routine as far as the actual seminar period was concerned. However, we began to face up to other problems:

1. People on the other side of the equator also have their summers in the other side of the year.

Dale Goodell, Associate Director, Cooperative Extension Service (at microphone) with Richard Bullock, Assistant Director, Hawaii Agricultural Experiment Station, was instrumental in establishing regular monthly specialist seminars in association with Dick Dale, Ministry of Agriculture and Fisheries, Wellington, New Zealand. Background, Abelina Costa, PEACESAT Assistant for Exchange Development and Project Director, John Bystrom. March 1972.

When we have a full complement of faculty and are ready to proceed in a regularly scheduled program, the people down under are in the midst of summer vacation, and vice versa.

2. As the schedule wore on and the newness wore off, it became a little more difficult to keep a handy supply of volunteer participants. We had already found out that if such a seminar was to be valuable, careful preparation needed to be made ahead of time. This took time and concentration. We found that personnel of our College reacted to this new venture much the same as they did to television and radio programs. Some people felt happy in performing, whereas others detested it.

We found it necessary to meet with the department chairmen to explain the importance of personnel scheduling time for this activity. The reaction of the various department chairmen also ranged from good to bad to indifferent. We held a series of meetings with department chairmen and with a group of the participants who were the most enthusiastic. This helped considerably.

You can see that the subjects were broadening out and covering entirely new areas.

In early fall of 1973 we began facing the drought. Money for the continuation of the PEACESAT program was drying up. Satellite time was being reduced. Along with this, the fact that the system had gradually increased in size with new terminals and participants over a two-year period, the area served was spread out considerably, not only geographically but also in terms of interest, needs, and capabilities. We were finding that programs that were highly interesting to one country (for instance, employment in the garment industry in New Zealand) might be met with yawns of boredom somewhere else. At the end of a special evaluation session, which included Hawaii, New Zealand, and New Guinea, we agreed that the program should continue and final arrangements were made to compare ideas by way of facsimiles.

Rules we agreed upon for improving the series were as follows:

1. Groups should participate on a reasonably wide basis.
2. Select topics that are of interest to more participants.
3. Use facsimiles ahead of time to work out a more specific free-discussion guide.
4. Make shorter statements, stick to the subject, and give more pertinent information.
5. Immediately embark on the development of a fixed, long-range schedule.

Some of the suggested topics for the new series, which would begin in the spring of 1974, included poultry, citrus, beef, and swine production in the tropics; land development in the tropics; and agricultural publications and communication methodology.

At the beginning of last year, we made an honest effort to pre-plan, exchange facsimile discussion outlines ahead of time, and exchange pertinent publications between participating terminals. In our case here in Hawaii, we got the chairman of our information section involved, and he mailed materials to Saipan, New Zealand, New Guinea, Fiji, and Tonga.

In the second seminar of the series, Mr. Robin Plummer of Suva, Fiji, served as seminar chairman and developed an agenda covering radio as a tool in Extension, visual aids and their use, and new media (especially audio-visual hardware).

Again, through further discussion and exchange of facsimiles, we felt it necessary to further restrict the discussion topic. We finally ended up not being able to cover all of that expected agenda and we followed up with more concentrated ones after. The first one limited itself strictly to radio. The topics were:

1. How long people listen to radio programs
2. Techniques to use in increasing radio popularity and effectiveness
3. What subjects lend themselves best to radio work
4. How to determine the best time of day for programs based upon the target audiences.

As we moved into our summer (New Zealand's winter), we reverted back to subject-matter areas. During July, August, and September, a discussion series was developed entirely apart from agriculture. It included nutrition and growth of children, food combinations achievement,

"Benefits from PEACESAT include the application of research results under local conditions in which only slight applicative changes are required. This saves time and money to carry on independent research."

Dr. Kenneth Otagaki
Director, International
Agriculture Training Programs
University of Hawaii

dental health, and nutrition education for women. This past fall we started back on agriculture subjects but again refining and confining the subjects to "chewable mouthfuls."

In more recent months, we have been discussing the possibility of using the system in conjunction with computers for the relay of agriculture information.

Educational Possibilities

Now I would like to talk briefly about some of the possibilities that emerged after we have worked on this program for some time.

During part of February and March of this year, I was a member of a three-man team that did a fairly extensive study of agriculture throughout the Trust Territory, plus Guam and American Samoa. Part of our job was to elicit from agricultural officials problems or obstacles they had to increasing production of feed and fiber. Many of these, of course, fell in the area of education. I will list these problems here just to give you an idea of the scope of them. As I go through them, please think about how the use of the satellite system might help in focusing on some of these needs:

1. Formal degree training for local people in preparation for government agricultural work.
2. On-the-job training, for both educational methods and subject matter.
3. Quick communication on diseased animals and plants.
4. Library service.
5. Help in writing job descriptions, straightening out organizational structures, and developing role relationship statements.
6. New 4-H or youth-project materials.
7. Simple publications written in local language.
8. Support in researching new problems.
9. Soil classification and testing.
10. Help in crop estimating and reporting.
11. Help in organizing markets.
12. Help on public health problems.
13. PATS Ponape Agriculture and Trade School wants answers about nutritional aspects, management, and feeding of local-grown products to animals.
14. Truk wants to know why the East-West Center program of education in the Trust Territory has slowed up.
15. All want training in homemaking skills, particularly in nutrition.

This is not the total list, but it does give you an idea of the kind of questions and requests we received. Some of these have very little in common with PEACESAT. Others appear to me to fit quite well into our seminar series.

One example I have thought about considerably is the training of agricultural staff people about plant diseases. We're developing a series of single sheets, each sheet covering one plant disease. It includes a beautifully colored photograph of the disease symptoms, then a short and simple description of the disease, what causes it, and how to control it. Spaces are left on the same sheet for the message to be written in the local language. It would appear to me that running a series of seminars on plant diseases of the tropics, using these sheets as reference material during the discussion, would be highly worthwhile in the professional upgrading of agricultural staff members. We, of course, immediately run into the problem voiced earlier of providing educational service of a highly specific nature, which may not be of interest to other countries within the system. Many states are presently using this combination technique of two-way radio communication in conjunction with printed material as a standard form of staff training. I think it would work.

These agricultural specialists are viewing a coffee harvesting demonstration in Kona, Hawaii. This direct experience knowledge may be later shared with other extension agents by satellite. July 1974.

As we look down the road, it is obvious that we have not solved all of the problems of PEACESAT. There are technical as well as human problems, and we must all recognize that the problem of money may loom larger than any of the others before we are through. I am hopeful, however, that we can keep going. I think it is past the "new toy" stage and has demonstrated its serviceability. We in the College of Tropical Agriculture in Hawaii intend to keep participating if we can.

James Holderness, Hawaii Agricultural Experiment Station Editor. One PEACESAT experiment involves regular information exchange by agricultural information personnel at Pacific-wide locations. July 1975.

"It is obvious from our satellite exchange that the communicators in the Pacific Isles and New Zealand are all going about things in different ways. Where we use newspapers for 15-20% of our work, Fiji depends on it for 40-45%. Where we depend on our specialists to do most of the writing in their disciplines, specialists in writing do more of the reporting for disciplines in New Zealand. Because of these variegated approaches to doing our jobs, I think information people in the Pacific stand to gain a great deal from dialogues such as those offered by PEACESAT."

James S. Holderness
Station Editor
Hawaii Agricultural
Experiment Station
University of Hawaii

CONTROLLING EPIDEMICS

One of the advantages of the small satellite ground terminal is its ability to go wherever the communications are needed.

In initially planning the project, we were most interested in the use of this type of system by research teams and for control of disasters. It is, of course, well recognized that international cooperation is essential to limit the disease and pestilence that ravages plants, animals, and mankind.

Dr. Leon Rosen has demonstrated PEACESAT's value by applying it to advance research in the control of an epidemic of dengue fever. For over three years medical research personnel and public health officers have been linked by PEACESAT. This close tie reduces the lag time between the development of knowledge and its application. Elsewhere in this publication, this point is also made by Dr. Peter Beales of American Samoa.

In a telephone conversation, Dr. Rosen tells how he started this epidemic control application. A report prepared by Dr. Frank Austin, New Zealand virus researcher, illustrates the impact on one professional.

EARLY EXPERIENCES WITH PEACESAT

Dr. Leon Rosen
Head, Pacific Research Section
National Institutes of Health
June 1973
(transcribed from recorded interview)

We have used the satellite system to talk to four different localities: first, to our headquarters back in Washington, D.C. and the National Library of Medicine; second, to people in the virus research laboratory in Suva, Fiji; third, to our staff members in American Samoa; and finally, I took a receiver down to French Polynesia to demonstrate it to the telecommunication authorities in that locality.

As for our experience with Washington, there is a ground terminal at the National Library of Medicine (Bethesda, Maryland) and in general, this proved effective.

However, persons had to be willing to go over to the transmitter site at the NLM to talk directly to us. When we attempted to use phone patch facilities, we ran into difficulties--not insurmountable difficulties, but they resulted from lack of technically competent persons in charge of the equipment at Washington. The people I was talking with were scientists who had little or no knowledge of electronics, and they were not really competent to diagnose technical difficulties. These people had to walk a mile or two over to the NLM from their laboratory. After a while this became a nuisance and after the novelty wore off, it wasn't really that useful to us.

If phone patch facilities had worked properly it would have been very useful. This would have allowed conversation from the desk without great expenditure of time, about problems in the virus research field on which we were collaborating. Information could have been exchanged quickly which would have taken much longer by letter and would have been prohibitively expensive at current telephone rates.

One advantage we did have over the telephone, at least in my experience, is that we often have echo problems in telephone service in Washington. But in the type of conversations we carried out on PEACESAT (simplex system), we had the most satisfactory means of communication, and it works very well.

As for French Polynesia, I took down a small transceiver and portable antenna to a relatively remote island of Taiaro in the Tuamatu Archipelago where we are doing some mosquito experiments. My purpose was to test the feasibility of using this type of equipment in a remote locality where it would have to be carried in through the surf and other rough conditions.

Dr. Leon Rosen (L), Pacific Research Section, Honolulu, and Dr. Jacques Laigret, Director of Medical Services, French Polynesia, January 1974.

The equipment at the receiving end worked very well. The antenna also worked very well. It was an antenna that was put up in pieces. I put it together there and rotated it by hand, and there was absolutely no problem at all on the receiving end. I carried out some experiments in collaboration with Professor Katashi Nose recording the strength of signal at various transmitted powers. It really worked very well. We had no authority to transmit so we couldn't see how useful portable equipment would be for two-way communication. As far as receiving is concerned, there was no problem whatsoever.

The same thing took place when I demonstrated the receiving capabilities to the telecommunications authorities in Tahiti. They were quite interested and quite impressed with the demonstration. The Hawaii terminal had prepared a message for them in French and they were quite surprised that with such a small amount of equipment they got such excellent reception. Naturally, they can foresee great usefulness in this sort of system for communicating with the many widely scattered islands in their territory. Probably, they would be happy to rent some satellite channels for that purpose if they became available on a commercial basis at a reasonable cost.

As for Fiji, the PEACESAT system proved to be a very useful mechanism. I was able to get some very important information directly from the people concerned in the virus research laboratory there, with an opportunity to ask questions and to talk back and forth. I think it proved useful to their research and to ours, again, the advantage being the excellent nature of communication.

Perhaps we used the satellite more extensively for work in American Samoa than anywhere else. We had a team of people down there for a total period of 5 or 6 weeks. We kept in contact with them about two or three times a week during this whole period. This proved very useful as far as directing the work is concerned as the people in the field are relatively inexperienced. This allowed me to spend only a minimal amount of time down there setting up the work. I was able to direct them at long distance, when any problems came up, many of them impossible to deal with in advance.

In this particular instance, PEACESAT proved especially useful because the other two means we might have used--a commercial telephone and a ham radio--were particularly unsatisfactory. We used both of these; and the satellite communications proved far more useful and satisfactory. They had some technical problems installing their transmitter down there. I don't know what the cause of it was, but we were able to get by despite their difficulties.

My main interest in the satellite communication system is for use in remote areas where we don't have either commercial telephone or telegraph facilities. In the past I have used ham radio, but it doesn't have a lot of the advantages of the satellite system.

This means we are interested in portable type equipment that can be run off a small power supply. Most of the existing PEACESAT ground terminals are run with pretty powerful equipment which can't be classed as portable, although it is transportable. I don't see any reason why we couldn't develop a portable type of equipment, although I'm not sure that it exists at this time; that is, equipment with the capabilities of rugged service in remote areas running on minimum power.

I would say that if we could develop this portable type of equipment and make more use of permanent larger transmitters in some of the centers of the Pacific Islands, it would certainly facilitate the type of work we are engaged in. Of course, less expensive communication between here and Washington would greatly facilitate our work. There are times when we would like to confer with people back there but we hesitate to do so because of the expense involved in using the telephone.

What we are interested in is easy, cheap, mobile communication with our colleagues working in other areas, and there is just no question that this would speed up the nature of our work, cut costs, and be to everyone's mutual advantage.

If we can get a good permanent system, I am sure there will be no problem finding takers for many different fields of activity in the Pacific Islands. Certainly it will greatly facilitate both distribution of advice and medical care, medical education, and research activities.

DENGUE RESEARCH COMMENTS

Dr. Frank Austin
Virus Research Unit
Medical Research Council
Dunedin, New Zealand

During the past seven weeks staff members of the Virus Research Unit of the Medical Research Council of New Zealand participated in nine PEACESAT conferences on the dengue epidemic, which is affecting the inhabitants of several island groups in the South Pacific. Other participants have spoken from Suva, Noumea, Tonga, Rarotonga, Niue, and Honolulu. The New Zealand PEACESAT terminal is located in Wellington and was linked to Dunedin by telephone.

The dengue epidemic began in Suva early in January 1975 and gradually built up in that city until by the end of February more than 300 cases had been notified, with the certainty that at least the same number of cases had gone unreported. The epidemic continued to increase until the middle of March when more than 1,000 cases were seen at the Colonial War Memorial Hospital in Suva in one week. Early in March the disease spread to other parts of Viti Levu and cases were reported from other Fijian Islands and Tonga, and later from Tahiti and the New Hebrides.

The conferences have been invaluable in the rapid dissemination of information and in allowing discussion and consultation amongst personnel in areas affected by the epidemic and in laboratories involved in diagnostic investigations. Epidemiological data such as numbers of cases, types of disease, areas involved, availability of equipment for mosquito control, and progress in control were promptly circulated. Participants were able to discuss and assess technical aspects such as types of specimen to collect, tests to be used, interpretation of results, diagnosis of cases, and epidemiological control. The presentation of different points of view was facilitated, and through them the combined experience of all of the participants was made available. This was especially important as the epidemic developed in Fiji and types of the disease, more serious than had been known in the area before, were reported. The exchanges between Dunedin and Suva have been particularly useful because a staff member of the Virus Research Unit spent six weeks at the Wellcome Virus Laboratory in Suva carrying out diagnostic and epidemiological investigations, and the prompt exchange of information permitted maximum utilization of resources and prevented duplication of effort. Technically the net was very good. The simplex one-at-a-time over system is effective for the exchange of information and is probably an advantage in a conference as it allows each participant to present his point of view without interruption. Signals received were generally intelligible, although transmissions from Tonga were often difficult to copy. A comparison of tape recordings made directly from the receiver in Wellington with recollection of the reception by telephone indicated that the line between Wellington and Dunedin contributed an appreciable amount of interference; in fact on one occasion it became so severe that the telephone link had to be interrupted and restored on another line. For this reason a case might well be made for the installation of a satellite terminal receiver in Dunedin.

It is clear that conferences such as these with the immediacy of communication, and the facility of immediate clarification of any misunderstandings are an ideal means of communication in an epidemic situation such as that prevailing in the South Pacific.

DEVELOPING INDIVIDUALS

The sharing of course work among institutions of higher education was first demonstrated by a class in interpersonal communication. The effort involved separate campuses of the University of Hawaii and is reported by Burton Byers.

Later several campuses were linked in a joint international effort reported by Ralph Stueber and involving Victoria University (N.Z.), the University of the South Pacific (Fiji), and the University of Hawaii (U.S.). The University of the South Pacific has used the Regional Education Network to offer a successful course in land tenure to extension students at the USP Centres located in a number of nations in the South Pacific.

Burton Byers, Associate Professor of Communication, University of Hawaii at Manoa, was joined in the design and implementation of the experiment he describes by colleagues Thomas Kugler, Instructor in Speech-Communication, Hilo College Campus, and Elizabeth Kunimoto, Assistant Professor of Communication, Manoa Campus. Of special interest is the design of the course, based on peer teaching through interaction of students separated geographically. The terminals used were at Hilo College on the Island of Hawaii and the Manoa Campus, University of Hawaii on the Island of Oahu, 200 miles apart. Two-way voice and facsimile were used.

CLASSROOM INTERACTION— SATELLITE-INTERPOSED

Burton H. Byers
Associate Professor of Communication
University of Hawaii

Arrangements were made in early spring of 1971 to interconnect two sections of the basic course in interpersonal communication at the University of Hawaii, one section at the Manoa Campus in Honolulu, the other section at Hilo College in Hilo.

A principal purpose of the initial experiment was to discover what could be done with voice-facsimile interconnections.

The Plan

The plan was adapted from ideas drawn from the Hawaii Communication Test, developed for the State

First satellite course for credit. Burton Byers, Associate Professor of Communication (standing). June 1971.

Department of Education by Dr. Arthur Coladarci (Stanford) and Drs. Heinberg, Harms, and Byers (University of Hawaii).

With the two sections of the basic course, Honolulu-Hilo, the central purpose was to discover whether students, widely separated by distance but joined by PEACESAT, could learn to work together in problem solving and the exchange of information. Seven experiments were scheduled: (1) getting acquainted; (2) basic intelligibility; (3) giving directions, or the communication of instrumental information; (4) affects; (5) problem solving; (6) information gain; and (7) attitude prediction.

These experiments were scheduled in twelve hour-long sessions during the six-week summer term.

The "getting acquainted" experiment consisted of 24 students, 12 at each ground station, giving his name and spelling it, and giving one fact about himself. Students alternated: first a Hilo student, then a Manoa student, and so forth. Students at both stations kept written notes. Criterion was reached when each student could spell the name and give one fact about each of the other students in the project.

Basic intelligibility was defined operationally in two ways: the ability to read short lists of phonetically balanced words (CVC) and to write down the words spoken; and the ability to select the words spoken from lists of five similar sounding words (multiple-choice). This and similar experiments to follow yielded four scores for each participant: scores as source--face-to-face and satellite-interposed; and scores as respondent--face-to-face and satellite-interposed.

"Giving directions," or the communication of instrumental information, was defined operationally as the ability to describe an abstract figure so that the persons

listening, in the classroom or at the other site, could respond that the figure described was the same as, or different from, the figure on their response. Persons at each site had lists of figures such as those shown in Figure 1.

Figure 1: Giving Directions

	Site 1 (Source for all odd-numbered items)				Site 2 (Source for all even-numbered items)		
	Same	Different	Name of source		Same	Different	Name of source
1.	___	___	_____	1.	___	___	_____
2.	___	___	_____	2.	___	___	_____
3.	___	___	_____	3.	___	___	_____
4.	___	___	_____	4.	___	___	_____

The "affects" experiments were of several sorts. In the first experiment, students alternated, Hilo-Honolulu, speaking the single word, "hello," so as to cause other students to mark their response sheets to correspond with the assignment sheet (Figure 2).

Figure 2: Affects

Assignment Sheet		Response Sheet	
Source:_____		Respondent:_____	
Say "hello" so that your respondents will mark: He sounds as if he		The speaker sounds as if he	
__likes me.	__does not like me.	__likes me.	__does not like me.
__is serious.	__is not serious.	__is serious.	__is not serious.
__is my superordinate.	__is my subordinate.	__is my superordinate.	__is my subordinate.

Another "affects" experiment required students to give a short explanation of how to get to the nearest airport, restaurant, or library so as to help the respondents check one of five emotions: sad, happy, enthusiastic, indifferent, sincere. Still another asked respondents to mark a scale from "up" at one end, defined as happy, enthusiastic, confident to "down" at the other end, defined as sad, indifferent, discouraged. The source spoke in a language not known to the respondents. In this case, one source spoke in Japanese, one in German, and one in Italian.

In the problem-solving experiment, the students worked in groups of four, two from Hilo and two from Honolulu in each group. The students from Hilo were given a part and the students from Honolulu were given another part of the information necessary to discover new information and solve the problem.

The information-gain experiment was the most elaborate of the term. A team of students at both sites chose a topic, analyzed it, and constructed a 15-item multiple-choice-type test measuring the principal cognitions that the team hoped to communicate. This test was given, as a pre-test, to students not involved in the satellite experiment. Then each team had a one-hour period to present its information via satellite, after which the students at the other site took the test. Measures of central tendency were computed for both pre- and post-tests, giving an indication of the amount of gain achieved by the students using the satellite interconnection.

The final experiment was an exercise in predicting the attitudes of other students, known only by their satellite voices, on a controversial issue. Teams of students chose an issue and took a position, which they judged would seem controversial to the students at the other site. Each team then marked a semantic differential scale, predicting how the respondents at the other site would mark, after the presentation (Figure 3).

Figure 3: Semantic Differential Scale

Agree	/_/_/_/_/_/_/_/_/_/	Disagree
Reasonable	/_/_/_/_/_/_/_/_/_/	Outrageous
I would help put this proposal into action.	/_/_/_/_/_/_/_/_/_/	I would actively oppose this proposal.

The game was to make the means of the respondents' reactions approximate the prediction of the source team. This experiment was never completed because of the preemption of our satellite time by NASA control.

Results

After each satellite interchange between the students, the instructors at each site compiled the scores on a single data sheet, giving scores for source and respondents, both face-to-face and satellite-interposed, for each student at his site for that day's experiment.

A student's face-to-face source score was the percentage of correct responses elicited from the other students in the classroom from which he was transmitting. His source score, satellite-interposed, was the percentage of correct responses elicited from students at the other site. A student's respondent score, face-to-face, was the percentage of correct responses given to students transmitting from his own classroom; satellite-interposed, his response score was the percentage of correct responses given to messages from the other site.

Each afternoon these outcomes were exchanged via facsimile, so that on the morning following each transmission, the students had a record of how they had done in the experiment of the previous day. Like some other aspects of this project, the data-gathering and reporting methodologies were ad-libbed. There is no way to estimate, on the basis of hard data, how powerful a force this quick knowledge of success or failure was in motivating and guiding the learning that took place. It is this writer's educated guess that the facsimile reports of the previous day's scores were exceedingly important.

Conclusions

Several important preliminary lessons can be learned from this experience.

Written reports from students indicate that they were excited by the opportunity to expand the regular classroom exercises to include the satellite-interposed dimension. The project was successful in demonstrating that students, widely separated in distance but connected by voice and facsimile transmission, can get acquainted and can learn to communicate cognitive, instrumental, and affective information at a satisfactory level of accuracy. They can work together to solve problems and they can produce statistically significant information-gain in their friends at the other site.

Many frustrations and disappointments were encountered, a few of which are inherent in the mode of communication, many of which can be eliminated by more and better planning. Most frustrating to the students was the noise level in the satellite classrooms, a function of the equipment. On several occasions only 20 to 30 minutes of the allotted hour were used. During the rest of the hour the students would sit and try to decipher spoken messages obscured by noise. The engineering people insist that this difficulty can be overcome without increasing the cost of the equipment.

A second need, susceptible to solution by the teachers involved, is for a better system for recording and reporting the communication outcomes of each interchange. A better system would almost certainly increase the satisfaction of the students and improve the rate of learning that might be achieved.

The nature and scope of the learning activities can be greatly improved. For example, the "get acquainted" activity might be improved by exchanging photographs, by mail, prior to the satellite interchange. As each student introduced himself, students at the other site(s) would try to select his picture from the display of photographs of students at that site. On learning which photograph was that of the speaker, the students could begin learning to associate his voice and style with his photographic image.

SHARING UNIQUE EXPERIENCE

PEACESAT provided a natural opportunity for the experiences of small isolated communities to have an impact on the powerful societies. The advantages of the two-way system for cross-cultural communication was demonstrated by poets from Hawaii, Fiji, New Guinea, New Zealand, and the Kingdom of Tonga who used the telecopier and two-way audio communication to share their poems in sessions via satellite.

The PEACESAT exchange was the first public performance for many of the poets. Local traditions and perspectives were shared on an international basis. The two-way system allowed them to ask questions about native words and phrases and to gain a more complete picture of the poet and the poem.

The series, which began in October 1972, was proposed by Margaret Blundell, Lecturer-in-Charge and Terminal Manager of the University of the South Pacific Center at Nuku'alofa, Kingdom of Tonga.

Lost But Found

Sam Andrew
Lae, Papua New Guinea

They boarded the caribou - Moresby bound,
The green painted army craft.
In the fading dusk,
And mothers thronged the crowded shed at Jackson's.

In expectant silence they sat,
Their seat belts tightened.
Home their fleeting thoughts evolved.
It was but memories,
The life at the barracks.

The sun had died and the ground had fallen.
For it gained momentum,
And they knew it was,
The sky around as oceans of green flow.

Anxious but patient,
While the crowds aimlessly
Thronged the streets.
They waited - Jackson's Airport.

They flew to the west of Lae,
But aiming for the south,
The seasoned craft eating the distance.
The air grew hungry,
But they gained height,
The air grew angry,
And they lost sight.

They waited,
With reunion employing their thoughts,
In the melting dusk of that evening,
The friends of the twenty-five.

But they came not,
In the bewildering rage of that primitive night.
A thousand hopes were drowned,
And the craft was not to be found.

Lost!
In grim silence,
They scanned the skies imploringly,
Radars blipped! Hearts probed.
The night chided its subjects,
With its envelope of mysterious importance.
They were heavy.

Poets in the Kingdom of Tonga sent poems by facsimile to poets at Pacific locations prior to an international reading hour. October 1972.

Lost!
Their tribal dreams,
All the peace treaties came to nought
The unspent warriors, the seeds of hope
Had died a fruitless death.
"All but three died."

In the pocketed hamlets,
In the jungle of suburbia,
Deep probings, crying palpitations,
Placations, appeasements.
A rare epitaph for the lost ones.

Lost!
But found in the ebbing tide of hope,
A new passion as young,
A new vision as bright,
As the rising of the sun,
For it had stirred that embryonic giant unity.

(Mr. Andrew is a fourth year student in Civil Engineering at the University of Technology. This poem is a response to a plane crash in which twenty-two of twenty-five high school students died.)

Riddle

Nau Simone
Kingdom of Tonga

Salutations to the one of Polynesia
And to the heroes that are lying in peace
And the constellations in the silvery sky
Which are communicating with Saineha
When course stars are visible above
Blessings still run high
A land so differently constituted
Surveyed it was of old
As is known by a Bibliophile
The realization of mythologies
And still forms the brunt of traditions
Of the casuarina tree at Va'epopua
Tangaloa 'Eitumatupu's
Maui 'Atalanga and Maui Fisher-of-lands
A fig tree with golden fruits
Which was the object of yearning
For the generations of yester-years
Now it is heavy with fruit
Come let us bedeck ourselves
On the prophecies of the myths.

A riddle for you I pose
A mustard tree with golden fruit
That spreads from head to foot
Which claims my fond longing.

A riddle for you I pose
A rose bud in a vase of gold
That blooms in love compelling
And watered by mercy eternal
On which my hope is laid
O, the cynicism of old men
That wild birds would peck and sweep
And ruin complete
But now it's shooting and budding
Consummation of patriotic love.

A riddle for you I pose
A Paradise in Nature
A life of peace and comity
The tree is revealed by its fruits.

Dance you four legged beasts
And be merry, O birds
Shout in the deep, Cry in the shallow pools
Give praise to the waking bush-land.

A riddle for you I pose
One single grain of golden sand
Has given rise to an awesome hill
And stands in Tonga a central shrive
On which the multitude onward look
To Memphis and the artists grand.

Sailing in Our Age

Tevita 'O Helu
Kingdom of Tonga
Translation by Futa Helu

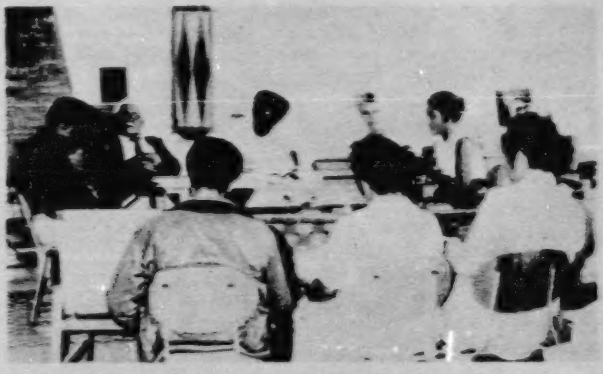
. . .And shouting through Malila
You shook course-stars from space
Tangakali of Tala-e-vaka

Manifested ancient of lands
Passing portentous spectacle
Alas, man, miracles work
Hasten, at the destination aim.

An age of resting seas
Becalmed but count ye breakers
And straight to the ocean paddle forth
Lest waves do sideways splash

And if the Eastern-wind becomes invincible
Then softly, tantalizing blow the Westerlies

Sail on and fast in racing mood
Compete but keep to the mark.



Two-way satellite communication permitted poets to share insights as to motivations for and cultural significance of their writings. October 1972.

What Art Thou Nature

Nature where art thou
Sitting on the summit of the unknown?

The peaceful have striven for ages
Let us feel thy touch, we are helpless!

Thy beauty looms
Dust and dirt thy eternal garment
Ah, numberless tributaries

Thy ways are currents great.

BUILDING EDUCATIONAL FOUNDATIONS

One of the arguments for interconnecting institutions by telecommunications is that the sharing of resources becomes possible. Better education as well as reduced costs can be the result. The experience in which three universities in three different countries structured a course around the opportunity for two-way international communication is particularly interesting for this reason. The principals in this effort in addition to authors Ralph Stueber, Professor of Educational Foundations, and Edward Beauchamp, Associate Professor of Educational Foundations and Field Services, were Frank Brown, Associate Professor of Curriculum and Instruction, and Solomon Jaeckel, Professor of Educational Foundations from the University of Hawaii, College of Education. Their Pacific counterparts were Anthony Hopkin, Lecturer in Education from the University of the South Pacific (Fiji), and John Barrington, Senior Lecturer in Educational Administration of Victoria University (New Zealand).

COMPARATIVE PACIFIC EDUCATION

Dr. Ralph Stueber
Professor of Education
Dept. of Educational Foundations
College of Education, University of Hawaii

Dr. Solomon Jaeckel, of the Department of Educational Foundations, initiated departmental participation in PEACESAT use through a short series of lecture-discussions on the history of American Education with Dr. Jane Ford and her class of education students on the Hilo campus of the University of Hawaii.

The international joint course was initiated. The first series of fifteen hourly transmissions ran from early March through June of 1972 allowing for the usual semester breaks or vacation time schedules of the two participating institutions. The series was initiated after preliminary discussions and decision-making between faculty members and department officials from the Department of Curriculum and Instruction, the Department of Educational Foundations, Dr. John Bystrom and staff of PEACESAT, and Alan Cutting of the University of the South Pacific. Several exploratory-planning-type transmissions were scheduled with Mr. Anthony Hopkin of the School of Education, University of the South Pacific, in order to agree on the range of topics, the format to be followed, and general objectives.

The experience gained during the 1972 series provided the basis for planning a second series for the spring months of 1973. In addition, the second series included planning and the involvement of Dr. John Barrington, Senior Lecturer in Educational Administration at Victoria University of Wellington, New Zealand, and other faculty students.

We gladly accepted the challenge of exploring the possibilities of satellite use in creating a cross-cultural learning community oriented to the Pacific Peoples--the Maori of New Zealand, and the peoples of Fiji, the South Pacific, and Hawaii, with special emphasis upon Hawaiians, Samoans, and Filipinos.

The 1972 series focused upon these areas:

- Teaching strategies with particular emphasis upon the involvement of the student in his own learning.
- Educational objectives in relation to assessment where the objectives are oriented toward the individualization of instruction.
- Promising innovations in schools, i.e., team teaching, peer teaching, non-graded schools, modular scheduling resource centers, etc.

The first series was designed to allow faculty members at the two participating institutions opportunity to exchange ideas, share problems, and, through direct experience, assess the potential value of PEACESAT to the professional work of the parties involved. Students played a role but the bulk of transmission time was faculty-rather than student-oriented.

The second series was more formally organized than the first, as would be expected, and student-to-student communication was the prime objective, with faculty playing a support role. Differing teaching styles and educational traditions, plus language differences reflected in the proceedings of the series, provided a rich resource for cross-cultural and comparative educational analysis as a kind of natural by-product of the more formally organized series of topics discussed under the rotating initiative of the participating centers of education.

In the 1973 series, students at the University of the South Pacific and the University of Hawaii participated on a credit basis. It must be kept in mind that American and essentially British systems of higher education, as found in Fiji and New Zealand, differ widely on the matter of courses, credit examinations, and degrees or diplomas.

Topics for the second series were selected in line with student needs and interests. Student participants ranged widely in experience and level of education, from first-year university students to advanced graduate students. Topics ranged widely: (1) educational planning and development in the context of political change, (2) ethnic, language, and social class influences upon school achievement; (3) the place of history in the school curriculum of schools in the South Pacific; (4) the place of cultural activities in the curriculum; (5) race relations and the schools; (6) ethnic life-style and the impact of formal schooling; and others.

During the 1972 series, each transmission was preceeded by data gathering and group planning on the part of participants at each institution. When possible, printed material,

Professors Frank Brown, Sol Jaeckel, and Ralph Stueber (L to R) of the University of Hawaii at the University exchange center conferring with faculty at the University of South Pacific. June 1972.

published or unpublished, was exchanged for purposes of study in advance of the actual transmission. Such collateral activity continued with the 1973 series but became more complex inasmuch as tapes and/or slides were especially prepared by the participants initiating a particular topic. These materials were mailed in advance of the scheduled transmission for the study and reaction by those at the receiving institution. As the series continued, bibliographic information and collateral research data and experience from other quarters in the Pacific and the world were brought to bear on the topics under discussion. Tape recordings of some of the transmissions were made for later reference and analysis and for use as resources to further research or classroom teaching.

There was always an air of genuine excitement among faculty and students, plus some nervousness, created or aroused by the experience of the actual transmission. While it is difficult to generalize, the basis of the excitement and enthusiasm appears to be found in the rare phenomena of live and direct long-distance communication combining simultaneously, geography, advanced space technology, culture, history, language, and high expectations on the part of those involved.

In a very real sense, PEACESAT makes possible a cross-cultural and international educational laboratory. Other than through actual study tours, it is unlikely that any other more conventional approach to learning could equal the potential effectiveness of PEACESAT. Even during this very limited experience as described, cultural, linguistic, and national barriers were reduced in relation to the success in creating a genuine dialogue. While major differences in educational approach and philosophy were encountered at every turn along the way, these differences, in fact, added zest and value.

Because the number of students entering higher education in the Pacific is growing rapidly, there is a consequent growing capability to identify and attack mutual problems cooperatively. This is especially true in the field of elementary and secondary education. It is essential that line of communication be extended so that there might be a vast multiplication of the collateral activities sketched out above. Our experience with PEACESAT has opened our eyes and ears to both the need and the genuine possibilities in this regard.

For many reasons, we do not see how PEACESAT, in the field of professional education, can be made to serve a broad, cross-cultural and international public unless a more forward organization is created and long-range commitment given by all parties involved. We believe we have had sufficient experience to encourage those in authority, and with funds, to take this essential next step.

Comparative Pacific Education Via PEACESAT

Exchange Topics
March-July 1973

Aspects of Education in Multi-Cultural Societies (University of Hawaii initiate)

Social Science Development (University of South Pacific initiate)

The Inter-relationship of Language, Ethnic and Social Class Factors with School Achievement and/or Non-Achievement (University of Hawaii initiate)

Aspects of Education in Multi-Cultural Societies (Cont.) (Victoria University initiate)

Race Relations and Education (University of Hawaii initiate)

From Village Life to Open Society--Problems of Identity and Community (University of South Pacific initiate)

The Place of History in the Schools of the South Pacific (University of the South Pacific initiate)

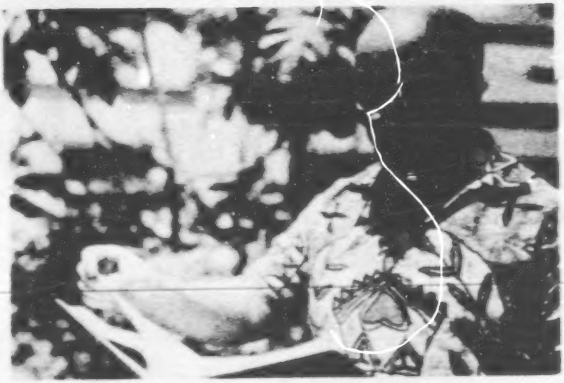
Educational Planning and Development in the Context of Political Change and Economic Growth with Particular Reference to the South Pacific (University of Hawaii, Victoria University initiate)

Peer Teaching (University of the South Pacific initiate)

Community and School Project 1973 (University of the South Pacific initiate)

Cultural Sensitivity and Cross-Cultural Teaching (University of Hawaii initiate)

Toward Assimilation or Separation--The Place of Minorities (University of Hawaii initiate)



Three university seminars provided first use of satellite interaction for a jointly sponsored college course. Edward Beauchamp, Associate Professor of Education, University of Hawaii. June 1972.

REACTIONS ON AUDIOTAPE TO THE USE OF PEACESAT

Dr. Edward Beauchamp
College of Education
University of Hawaii

I've been asked to say a few words about the PEACESAT experiment oetween the University of the South Pacific in Fiji and the College of Education of the University of Hawaii. On the USP end, the person primarily responsible for organizing and keeping the things running was Tony Hopkin of their School of Education. On this end, I think probably the key person was Ralph Stueber. He had help from Sol Jaeckel and Frank Brown. Unfortunately I wasn't able to participate as often as I would have wished to.

I completely believe that the experiment was a success. I think our students benefited from the experience of talking to their students and faculty. Also as they became familiar with the possibilities of a thing like PEACESAT and the use of the equipment, I think some of the intimidating aura of the satellite has worn off.

In addition, they benefited from the point of view that our faculty was very rarely, if ever, unanimous in their conversations with USP. We had a tendency, a healthy tendency, to disagree, rather vehemently on occasion. When I arrived in Suva on July 17, to attend the Third Pacific Seminar dealing with priorities in education in the Pacific Basin, I met Tony Hopkin for the first time. Tony's first

words to me were, "You know, you chaps up there in Hawaii are bloody mad." And this, I think, referred to our relatively free-swinging, open, liberal kind of attitudes toward the educational process. This contrasted rather strongly with their more traditional British-oriented kinds of feelings of what education is and ought to be. The cultural clash was very healthy. We can have common educational problems and perceive them in an entirely different way primarily because of our environment.

I hope very strongly that these communications will be able to continue with USP and that they will build strong and lasting institutional ties, particularly between USP and the School of Education here in Hawaii.

The communications satellite was a new concept to us. What an idea - talking on a microphone to people several thousand miles away! I think it was a tool we didn't know how to use properly. We had a tendency to use the tool as we would a telephone, to almost lecture to the people on the other end on occasion. I think we all need to think of it in a much more open way. One possibility would be to use the satellite in conjunction with other media--motion picture film, video tape, things of this sort.

One of the things USP did, which I thought was helpful, was provide us on a couple of occasions with a paper that one of their people had written. We had the chance to read the paper ahead of time, to react to it, and to use the paper as a basis for free-wheeling discussion. We need to explore this further.

I think we need to have more of an opportunity next time to really do more planning with the people of USP via the satellite before even starting a class. As in any first experience we have to learn to crawl before we learn to walk. Finally, we should try to make it an everyday part of courses. I teach a course, Educational Foundations 310, and I would like very much for my students to participate in this. Maybe as part of the regular course that will be offered next year.

Just to wrap this up, I guess a theme running through everything I've said is the need for more planning and more ingenuity and innovation. We have to try and be creative and to really make this tool live up to its full potential. I don't think that any of us can do it out of our back pockets.

DISCOVERING ECONOMIC INTERESTS

Participants representing seven disciplines and four geographic locations (Hawaii, Fiji, New Zealand, and Alaska) engaged in lecture discussions on international law of the sea and were linked with Francis Auburn, Lecturer in Law, from the University of Auckland (New Zealand). This experiment, conducted during April-June 1973, utilized six one-hour satellite sessions. It is apparent in these proceedings that the populations of the Pacific Basin have important interests in common.

Later, two additional activities in ocean administration and policies occurred. In 1974, George Kent, Associate Professor of Political Science, University of Hawaii, arranged for his class in ocean politics to explore positions on various questions of international sea law. In 1975, an experimental activity led by Douglas Gordon, Ministry of Agriculture and Fisheries, Wellington, New Zealand, linked professionals in an international seminar.

TEACHING OF LAW BY SATELLITE

F.M. Auburn
Faculty of Law
University of Auckland
Auckland, New Zealand

Purpose

The purpose of this series was to investigate the application of satellite communication technology for the teaching of law with particular regard to developing Pacific nations and territories.

Participants representing seven diverse disciplines and four geographic locations (Hawaii, Fiji, New Zealand, and Alaska) engaged in lecture/discussions on international law of the sea, which included such topics as "The United States Draft Convention on the Seabed," "American Mining Congress Bill," and "Artificial Island/Sea City."

Method

The experiment was arranged in order to examine the possibilities of teaching law, with particular regard to developing states and territories in the Pacific, by satel-

lite. The PEACESAT network was utilized for this experiment. The present experiment required a further link in the form of a telephone patch between the Wellington terminal and the writer's office at the University of Auckland. The agreement of the New Zealand Post Office had to be obtained for the patch. Communication for this experiment consisted of two-way voice exchange.

PEACESAT guidelines require that uses of the system should be by joint request, require instant two-way communication, service as many locations as possible, and not be carried out if other communications facilities would equally serve the purpose. There must be a definite educational or social purpose. New kinds of uses are given preference, with particular emphasis on projects that demonstrate long-range social improvement. The law-teaching experiment was specifically formulated on the basis of these guidelines.

The experiment consisted of six one-hour discussion/lecture sessions between 2:30 p.m. and 3:30 p.m. (N.Z. time) on 5 and 19 April, 3 and 17 May, and 7 and 21 June 1973. These sessions were preceded by extensive planning in preliminary sessions over the PEACESAT network and correspondence.

The subject chosen was the international law of the sea. This topic was felt to be suited for the experiment because of (1) considerable interest around the Pacific in the United Nations Law of the Sea Conference, (2) the similarity of law of the sea problems in a number of Pacific states and territories, (3) the topic's particular relevance to the developing islands of the Pacific in view of their lack of resources on land, (4) the recent emergence of detailed planning for manganese nodule mining in the Pacific in the near future, (5) and the numerous interdisciplinary matters that particularly lend themselves to discussion of legal problems by ocean scientists.

The program was therefore designed for ocean specialists who were not necessarily lawyers. It was felt that if such an experiment were successful, it might then be possible to plan a further experiment aimed specifically at university and high-school classes. This could open the way to teaching law, by satellite, to classes in developing states.

Participants

The participants varied, according to the topic being discussed. Their disciplines included government, political science, international law, marine biology, marine chemistry, oceanography, and geology.

Topics

Topics for all six sessions and suggested background reading references were circulated before the experiment

began. The study of this literature before each session by participants proved to be of considerable utility, and it is suggested that for the purposes of extension of the experiment to undergraduate or high-school classes each participant should be supplied with a modest folder containing articles, newspaper items, and pictorial material.

The topics covered difficult and unresolved questions of international law, all of which are of current interest to the Pacific and on which ocean scientists are working. The experiment was based upon an assumption of all of the participants' expertise in a related discipline. The reading matter was selected on the basis of relative ease of access in local libraries, current interest, and comprehensive coverage in a relatively small compass. It was assumed that most terminals would not have ready access to a comprehensive library on the session topics. The preparation of the background material did not represent a serious problem in this experiment, but in future work it may well require the pre-production of specific materials.

Technical Problems

There were remarkably few technical problems. Approximately three-quarters of one session was hampered by a communication hitch preventing telephone transmission from Auckland to Wellington, but this did not prevent the terminals outside New Zealand continuing discussion. Reception in Auckland was good. For future extension of the experiment to classwork, provision should be made for backup discussion by teachers at each terminal.

Session Content

Each session was designed to include three ten-minute lectures by the writer, with network comment and discussion following each lecture. Although the sessions were experimental, a number of useful discussions on an interdisciplinary basis and proposals for future work and cooperation emerged.

A number of interesting points were raised by participants. These included jurisdiction over precious coral outside territorial seas of Hawaii at a water depth of 400 meters, Alaska's archipelago problems, Japanese precious coral extraction 500 miles north of Midway, and the question whether Hawaii and Alaska should delay jurisdictional action until U.S. vs. Maine is decided.

Evaluation

The experiment demonstrated the feasibility of international law lecture/discussions by satellite involving a number of stations spread over a third of the globe. It is suggested that the experiment provides a basis for further work with undergraduate and high-school classes. The classes would have

to be small (Not more than 10-15 pupils). The pupils would be presented with preparatory material, and arrangements would have to be made for local discussion in case of interruption of communications.

* * * *

Topics and Required Reading

The United States Draft Convention on the Seabed

Auburn — "The International Seabed Area" (20) International and Comparative Law Quarterly (1971) 193

Knight — "The Draft United Nations Convention on the International Seabed Area" (8) San Diego Law Review (1971) 349

American Mining Congress Bill

Auburn — "The Deep Seabed Hard Mineral Resources Bill" (9) San Diego Law Review (1972) 491

Hawaii, Fiji, and Micronesia

Leversen — "The Problems of Delimitation of Base Lines for Outlying Archipelagos" (9) San Diego Law Review (1972) 733

Artificial Island/Sea City

Stang — "Wet Land: The Unavailable Resources of the Outer Continental Shelf" (2) Journal of Law and Economic Development (1968) 153

Scientific Research

Burke — Marine Science Research and International Law, Law of the Sea Institute, Occasional Paper No. 8

Pacific Islands

Orent and Reinsch — "Sovereignty Over Islands in the Pacific" (35) American Journal of International Law (1941) 443

Oceanographers and political scientists at the University of Hawaii interact with Francis Auburn of the Faculty of Law at the University of Auckland, New Zealand (off camera). June 1973.

ENCOURAGING INTERNATIONAL UNDERSTANDING

High School students from four Pacific Basin nations participated in sessions of a Mock United Nations to develop and share international perspectives. Students involved represented eight different nationalities and were drawn from three large urban Hawaiian schools, one rural Hawaiian school, the preliminary education program of the University of the South Pacific, a New Zealand inner-city school with a large Maori population, and a small, rural high school in Papua New Guinea.

Discussion topics were originated by students in joint preliminary satellite sessions. Evaluation indicated that students were impressed with the openness and honesty of participants.

Responsibility for the preparation of the discussion agenda, a sample of which is included, was rotated among participating institutions. Agendas were transmitted by facsimile via satellite to participants.

The quotations below have been excerpted from the audio record to give the flavor of the four-way conference exchange.

COMMON GROUND, UNCOMMON EXPERIENCE

Mock United Nations
March 1973

Transcript

(Maui): I would agree that if the population situation increases to the point where essentials to life become so scarce in the country they may be forced by their political pressures to take it, to try and take it, from other countries, and this is what would increase the serious likelihood of nuclear war.

(Maui): Another thing is that I think that a person should see himself not only as a citizen of his country but as a citizen of the world.

(Suva): And there is a saying that you can give a man a fish and it will feed him for one day, but if you teach him how to fish, he will have fish for the rest of his life. To teach people how to do things is better than spoonfeeding them with money. I'm not a very religious person, but the Lord helps them who help themselves. I have a friend here who wants to say something.

(Wellington): I have a statement from the Bible, it's from Genesis, Chapter 1, and it says, "And God said to them be fruitful and multiply." But when taking it in the light of present circumstances, it appears that this sort of statement has sort of backfired because there are too many people multiplying.

(Suva): I quite agree with immigration. Where I come from, and I come from an island and a lot of Cook Islands really, and this question is something that will interest New Zealand. Middle-class, tourist people are coming up to New Zealand... Why? Because the wages are so good. And New Zealand is attracting all these people up there. And they're doing it on purpose. A lot of my people I've found in Auckland and in the capital, and that's Wellington, trying to steal the resources of the Cook Islands.

(Wellington): I'd just like to say that our school, Wellington High School, is a very multi-racial school, and we have the highest proportion of Polynesians of any school in the Wellington area. Yours may well be a "brain drain" but we found ours ... it's become our reponsibility to support them. I know that that sort of has become a lot of trouble.

(Micronesian student living in Hawaii): Now, I do agree with what Susan said, because the Americans, they come down to my place and they were supposed to bring us up to what they call "civilized-civilization." But what actually they're doing now is just trying to uplift our culture and stuff like that...they make us ashamed of our culture because like when we go to school we don't speak our own language, we speak English.

Agenda

Programme - Thursday, March 22, 1973 NZ Time 2:30-3:30 p.m.

Topic: Nuclear Testing and the Pacific

Study Questions: Wellington High School, Private Bag, Wellington, New Zealand

WHS Speakers: Stephen, Lindsay, Leonard, Jo-Ann, Christine, Paul

Procedure: Each of the following statements will be presented by a Wellington High School speaker as a FOR/AGAINST statement to indicate the range of views. Participating schools are invited to speak similarly. At 3:15 (NZ Time) WHS will attempt a final summary and assessment of the exchange. Clarifying questions may be asked at any time.

Statements:

1. Nuclear testing is necessary to obtain more information on nuclear fission as a fuel/energy source in the future.

Wellington High School students chaired Mock United Nations Session on nuclear testing in Pacific waters. Peter Robertson, instructor, at right. March 1973.

2. The HAVE nations do not want any more nations in the "Nuclear Club" so they support actively all forms of protest against nuclear testing.

3. Nuclear testing is justifiable when a nation's existence is at stake.

4. If nuclear testing is carried out by any country, then the test area should be within the boundaries of that country.

5. Money spent on nuclear testing is money not spent on human problems.

6. The Pacific Ocean should not be used as a test zone.

7. Biological mutations as a consequence of repeated nuclear fallout may be one way of limiting overpopulation in the next century.

Appreciation: Wellington High School participants extend their thanks to all supervisers, technical staff and contemporaries for the organization and cooperation which makes these programs possible.

Agenda

Programme - Thursday, March 29, 1973 0230-0330 Gmt

Topic: The Population Crisis

Study Questions: Developed by the Pacific and Asian Affairs Council of Baldwin High School, Wailuku, Maui

Speakers: Danny, Les, Allen, Linda, Adele, Zachary, Tim, Teri

Procedure: Each of the following questions will be presented for general discussion. Participating schools are invited to

give their views. At the close of the session, remarks will be summarized by a PAAC member.

Statements:

1. Countries that can support large populations should be allowed to develop them.

2. Each country should be required to share natural resources.

3. Overpopulation increases the likelihood of nuclear war.

4. The United States should cease supplying foreign aid.

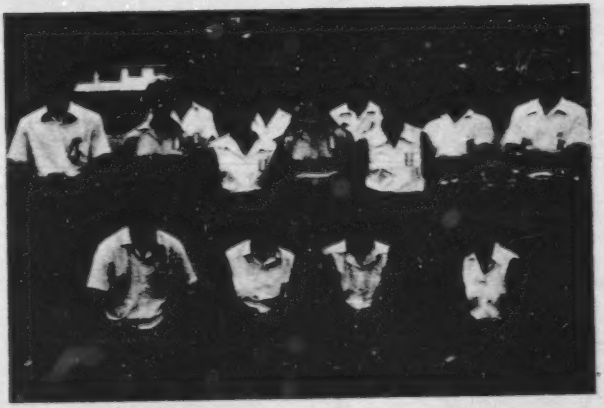
5. Paul Ehrlich, author of the Population Bomb, has stated, "The basic problem is too many people, and nothing else can be solved unless we solve that problem. Though overpopulation is the fundamental threat, the most immediate manifestations of the problem are poisonings of the ecological systems, and the threat of world-wide plague, weather change and thermonuclear war. Take your choice."

6. Can people be persuaded to modify their high standards of living in order to save the environment? If so, how?

We ask each school to prepare the following background information:

1. Definition of the population crisis.

2. Statistics on the average number of children per family; projected consumption in the next five years; and any national statements on population; and any national population programs.



Tereora College Form VI Rarotongan students organized high school forum on Pacific fisheries. July 1974.

SOLVING COMMUNITY PROBLEMS

The problem of drug control and public programs for treatment and rehabilitation was the subject of exchanges in 1973. Pictured here are the Honolulu discussants: Steve Smith, Executive Director, Waikiki Drug Clinic; Ted Susumago, Program Director, Heroin Detox Unit; Steve Davis, Waikiki Drug Clinic. June 1973.

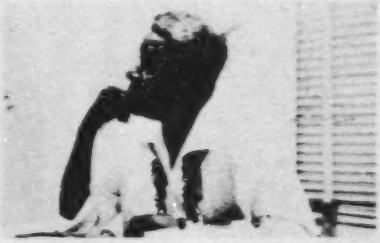
Transcript

Tina Reed (National Society of Drug and Alcohol Dependents, Wellington, N.Z.):

> *"We have all been confronted with this demand for education. We all feel--Ray, Graham and myself--that we don't want it to be exclusively focused on individual problems of drug addiction. It must be focused on reasonable community attitudes toward ex-drug users and that includes alcohol, tobacco, and all the rest. How do you educate society on this... Recently we have changed the whole emphasis and have tried to organize seminars and it's difficult to find those with the ability for these seminars...I wonder if you have any thoughts."*

Ira Vanterpool (Honolulu):

> *"Let me give you a typical week in drug education experience as we see it here in the State of Hawaii..."*



Chairing the exchange is Ira Vanterpool, Head, Hawaii State Drug Education Program. June 1973.

OPERATING LOCAL TERMINALS

An important question of interest to the project is the amount and kind of use small communities will make of the PEACESAT system. The following four reports, prepared by terminal managers for inclusion in an annual report to NASA, help to answer that question. These have been condensed, we hope, without harming the opinions expressed.

The terminals discussed are in some of the smallest societies in the world. The populations of Niue recently dropped below 4000. The Kingdom of Tonga has approximately 88,000 persons and the Cook Islands 21,000.

New Caledonia is more populous with 130,000 people. The terminal at Noumea, however, is directed to the small Pacific nations because it is operated by the South Pacific Commission in support of Pacific-wide development.

In general, terminals do not become busy immediately after activation. Some of the reasons are suggested by Rodney Spooner in his report on the early months of a new terminal. As time goes on, however, users are increasingly drawn to the terminal. Last week (October 1975), Rodney Spooner reported 24 hours of active participation by the Niue exchange center and said he is looking for more help.

TERMINAL REPORTS

1. Rarotonga

Stuart Kingan, Terminal Manager

This is a report on ATS-1 (PEACESAT) terminal at Rarotonga for the 16-month period March 1974 to June 1975. During this period, the Rarotonga terminal has participated rather fully in satellite communications experimentation primarily to find out the value to an isolated community, such as that of the Cook Islands, of a wide-area voice communication system.

During the period, the terminal has participated in over 400 exchanges involving a total of over 300 participants, or 3 percent of the population of Rarotonga. This despite the fact that the terminal is in an out-of-town location and participation in an exchange normally involves a drive of not less than 4 miles to the terminal.

Much of the popularity of the terminal has resulted from relatively efficient technical development. In order to get truly circular polarization for both transmission and reception and significant gains, the station built a simple and inexpensive antennae array consisting of four-phased, ten-turn helixes mounted on an 18-foot square aluminum reflector. A two-stage antenna-mounted preamplifier results in very good reception on a normal 2-meter transistorized receiver. The receiver is crystal controlled but can be tuned a few kilohertz above and below the satellite frequency. An audio amplifier and large speaker give very good quality reception with a voice to background noise ratio of 30 db or more on even weak signals. The transmitter is in the low power class with an output of less than 200 watts. Facilities are incorporated with the capability to double this power, but so far this has not been necessary. All participants comment on the clarity of the circuit particularly as compared to overseas telephone services to which they are accustomed or even as compared to local telephone circuits.

The nature of the experimental exchanges have been very varied. Most exchanges have been initiated by other terminals and have followed pre-planning exchanges in which the potential participants have taken part.

Capsule Summary of Activities

Exchange Topics

1. Medical Applications - Advanced and more up-to-date knowledge on the part of the participating doctors.

2. Medical Research - The introduction of an advanced medical research team from the United States National Institutes of Health to work in the Cook Islands in a study and mass treatment of filariasis.

3. Agriculture Extension - Improved knowledge of agricultural techniques and other tropical territories as well as new ideas for extension education, some of which have been adopted.

4. South Pacific Commission News Experiment - Weekly publication of news of other Pacific islands in both daily press and radio bulletin as well as in fortnight school journals. There had previously been no practical way of obtaining this news.

5. Correspondence Instruction - Considerable facilitation of an otherwise difficult situation resulting in the reduction of drop-outs among students involved.

6. Courses by Satellite - Three university credit courses have been taken by satellite. In 1974, six Cook Island

Stuart Kingan, Cook Islands Scientific Officer and Rarotonga Terminal Manager, September 1975.

students entered the USP course on Land Tenure and four obtained credits. This year seven are doing this course, and eleven are enrolled in the USP course on secondary school curriculum. Eight Cook Islanders entered and completed the Communications in the Future course originated by the University of Hawaii.

7. High School Students - During 1974, selected sixth-form pupils participated in a series of organized discussion with pupils of the same age in Wellington, Honolulu, Saipan, and other places. The pupils not only learned to express themselves and conduct organized discussions but also learned much of the problems of students in other territories.

8. Ocean Management Series - This helped to prepare the Cook Islands delegation to the Caracas Sea Law Conference.

9. Discussion on School Curricula - Some matters discussed in these sessions have been put into practice.

10. Education for Self-Government - At the request of the Legislators in Saipan and Niue, sessions were arranged in which the Cook Islands Premier and Deputy Premier each spoke on the Cook Islands constitution experiences after nine years of self-government.

11. Minor Exchanges - Many useful exchanges between Hawaii and Rarotonga, and Suva and Rarotonga facilitated visits of experts to the Cook Islands and participation by Cook Islanders in conferences and seminars arranged by the East-West Center and the South Pacific Commission. Discussions on other topics included Ocean Culture, Archaeology, High School Attendance, Public Health Laboratories, Elementary Schools, American Field Service, National Education Association, Industrial Nursing, Journalism, ERTS, the Earth 2020 series, Nutrition, Ethnomusicology, The Carnegie Conference, South Pacific

Commission Activities, Migrant Education, Biogas, Rotoract and Rotary, and the Introduction of Advanced Technology. Participants in all of these felt that they had benefited educationally from these discussions.

2. Niue

Rodney Spooner, Terminal Manager

Although this isolated island has good telegraphic and radio telephone communication with the rest of the world, a particular lack was felt in communication between the University of the South Pacific and students taking the University's extra-mural courses. Air mail services were erratic, sea mail services even more so, and very infrequent. The personal contact between lecturer, tutor, and students, which is so necessary in extra-mural work, was missing. So Niue's Education Department in 1973 investigated the possibility of overcoming the deficiency by joining with the established satellite system. Negotiations were successful and in May, 1974, Niue made its first voice transmission with Rarotonga.

Results beyond the extra-mural needs became immediately apparent. Urgent administrative message traffic between Niue and the other territories was passed, resulting in time saving, less paper work, and less confusion as person-to-person contact solved problems on the spot there and then. This applied particularly to course arrangements, official visitors coming in to Niue, final details of conferences, etc. Registration problems with the University were solved within hours rather than weeks. Contact with U.N.D.P. Specialists in Fiji was made, and discussions on curriculum matters took place.

But wider scope possibilities in using the satellite system beyond U.S.P. requirements through to the PEACESAT programmes soon became apparent. The Education Department evaluated PEACESAT programmes and decided to branch out, rather timidly at first. Interested Government Departments and individuals were notified of programmes of educational and vocational value. The response to this was overwhelming, so much so that in a short time more PEACESAT use was made of the system than U.S.P. use. This speaks volumes for the quality of the PEACESAT programmes--until the service was established, no need was felt for it. This is the reverse of the usual process.

Niue initiated three major series of programmes.

1. "Problems of Compulsory Secondary Schooling." This grew out of a discussion with the Principal of Niue High School after a Problems of Adolescents series. There were three sessions to this series with wide representation in the

Pacific. It has led to Wellington initiating a new series on Primary School Problems.

2. "Archaeology on Niue." This arose when Mr. Michael Trotter discussed his findings. This had more limited appeal.
3. "Modification of Traditional Customs." This came as a result of a conversation between Tahafa Talagi and myself.

Only two meetings have been held, but it appears to be generating quite a bit of interest. Further comments on programmes will be made under the evaluation section.

The satellite equipment is applied European technology, and the system's programme format is a European concept. Many Niueans were at first hesitant to use the system to its utmost by participating fully through discussions, preferring at first just to listen. With familiarity has come confidence; through listening, they have realized they have something to offer; through hearing other islanders using the system, they realize they can handle their ideas in English equally as proficiently; nervousness of the appearance of the equipment has disappeared. More and more Niueans are speaking on the system, participating, contributing, interchanging ideas instead of just receiving ideas, and suggesting topics for established continuing programmes. Three further steps have to be made and will eventuate, given time:

1. A Niuean will actually manipulate the controls of the equipment;
2. A Niuean will feel a need so strongly that he will initiate a major programme;
3. A Niuean will chair a session or a series.

Europeans, being more familiar with similar electronic apparatus, used the system fully in all ways right from the beginning. Niue's only venture so far at initiating and chairing a major programme was European-initiated and organized.

Niue administrators discuss policy on school attendance. Rodney Spooner, Terminal Manager (at microphone). June 1975.

The demand in using the dual system, PEACESAT and U.S.P., has grown to such an extent that it is beyond the capabilities of an after-hours volunteer service to administer and run the system on Niue. Approximately 30 hours of actual operating time and about 8 hours for administration each month are put in. To overcome the problem, the first step, already being taken, is to appoint a paid part-time operator, with the administration and supervision being continued by the Education Department.

Six months of operation is a suitable length of time for evaluation. There are limitations--such as shortage of time for discussions, only one being able to speak at a time, and reception problems. The advantages to Niue and its people in both the immediate and long-range terms, which have been briefly outlined, however, far outweigh the minor limitations. Niue is grateful to be associated with such a vital communication educational system, and nothing but good in aiding progress of the Island can come from this system.

Quarterly Statistical Return

Niue Satellite Use

1st Quarter 1975

A. PEACESAT Use	Hours
1. Full participation in Scheduled Programmes	58
2. Listening only to Scheduled Programmes	2
3. Taped only Scheduled Programmes	1
4. Participation in Management Meetings	13
5. Small Exchanges originating from Niue	0
6. Small Exchanges originating from others	0
7. Questions, etc., out for action	11
8. Questions, etc., in for action	3

B. U.S.P. Use	
1. Tutorials participated in	14
2. UNDP exchanges participated in	1
3. USP Message Time participated in	36
4. Other scheduled major programmes participated in	18
5. Other scheduled major programmes observed only	1
6. Other scheduled major programmes taped only	2
7. Small exchanges originating from Niue	5
8. Small exchanges originating from others	2
9. Questions, etc., out for action	13
10. Questions, etc., in for action	19

C. Combined Use

Time Station opened	75
Total Hours operator on duty	142

D. Number of Different Participants

1. PEACESAT	28 (20 Niueans)
2. U.S.P.	17 (11 Niueans)

R. G. Spooner
Terminal Manager, ZKNA

3. Tonga

Margaret Blundell, Terminal Manager

Introduction

The Tonga terminal was opened in May 1972 by H.R.H. Princess Pilolevu. Since the third quarter of 1972, PEACESAT has been in use most week-days in the late afternoon and occasional weekends.

1. A major problem of the network is the somewhat arbitrary times within which the programming has to happen. Most adult education is later in the day, so for free experiment, time is needed occasionally between 8:00 p.m. and 10:00 p.m., Tonga time.
2. Moreover, in a second language situation, really good reception is a necessity for civilized exchanges, and better techniques of discussion are badly needed with frequent referring back to smaller less developed places who with their poorer equipment, and a lifestyle that has only recently included discussion, need all the help and encouragement they can get.
3. Many of our problems on the Tonga terminal come from technical inadequacy of our hardware.
4. Problems also arise from agenda being often too long and wide. A limited agenda for a limited number of terminals seems the more effective. If people come they want to participate, so to have time for only one round, or to get left out because too much is coming from one or two verbose stations is bad, but it happens too often. Fairly rapid person-to-person is often the most successful.

Programmes

Right from September 1972, Tonga joined in a variety of activities--Education, Medical, and Agriculture probably

Margaret Blundell, Lecturer-in-Charge and Terminal Manager, Tonga. May 1972.

those in which there was maximum participation. Perhaps the peak year of use so far was 1973, as the equipment was weaker than some but still tolerable in use. Many people in the community were beginning to appreciate its potential use, and we are also taking part in VI-form discussions, nursing training, as well as the above.

That year we initiated from Tonga the Poetry Exchange between Polynesian poets. This sparked off some of our poets into spontaneous impromptu, which was very exciting. Unfortunately, the difficulty of timing as well as getting translations, quite apart from the technical problems of deteriorating reception and transmission, made it impossible for us to keep this going from Tonga.

In 1974 an interesting addition was using PEACESAT for pre-training discussion for VSA's in New Zealand before they came to Tonga early this year. This was followed later in the New Year with a discussion by a lively group of volunteers telling the administrators about the relevance of their pre-Tongan training. The year 1974 was one in which the problems of Tongan emigrants to New Zealand was in everyone's minds and before our equipment deteriorated, some useful discussions were held in this field, and in the subsequent discussion this year. Tongan people would have joined if the equipment had been adequate and reliable.

Another interesting three-way discussion has been with Friends of U.S.P. in Wellington about areas in which they could help the Centre. At this, the personal and immediate qualities of PEACESAT came into their own. Also last year, Tonga participated in Museum discussions, although we have yet to have a museum, SPC News and various USP sessions.

4. Noumea

Pat Mahony, Terminal Manager

The South Pacific Commission, which operates the terminal, is an international development organization

established over a quarter of a century ago to improve health conditions and promote social and economic development in the Pacific Region. The annually convened planning committee and conference, consisting of delegates from every country and territory in the area, evaluates and approves the total work program and budget of the organization. Thus, all of the SPC activities are subject to the scrutiny and control of government in the region to insure that all the Commission's projects are desirable and helpful.

Since the South Pacific Commission specialists are constantly traveling all over the Pacific assisting developing projects, carrying out training activities, and advising government, the satellite communication system can provide a simple and efficient means for development specialists to confer with one another between the widely scattered islands where they are working. The communication exchanges are especially helpful when several locations are involved and when ordinary letter, cable, or telephone traffic is either inadequate or unavailable.

The South Pacific Commission has had its PEACESAT terminal in operation since January 11, 1974. Consistent with its conception of its role as an international body providing technical assistance to nations and territories of the South Pacific Region, the Commission's use of the satellite has tended primarily to be responsive to the inquiries and interests of other terminals rather than initiative of its own projects. One exception to this pattern has been the highly successful South Pacific Commission Regional News exchange, which was initiated by the Commission's educational broadcasting officer who was then based at Suva, Fiji.

In the period between February 20, 1974, and June 19, 1975, SPC Noumea has taken part in approximately 70 scheduled exchanges. The number of participants from this terminal has been nearly a hundred persons.

Over the same period, this terminal has participated in some twenty multi-terminal exchanges relating to one or another of the programs currently being undertaken by the Commission in the various parts of the Pacific. Three of these exchanges were initiated by the Commission, two originating at the Suva terminal, one at Noumea. The first two of these were the aforementioned Regional News exchange, proposed by Ian Johnstone, former educational broadcasting officer of SPC, and the second one was between the territorial directors of education called by the SPC program director, Frank Mahony. The third exchange originated by the social service officer, Francis V. Mahoney, dealing with planning of Pacific social welfare training curriculum.

5. American Samoa

Not every terminal has been as successful as Rarotonga or Niue. Each terminal is an outgrowth of some local interest and is affected by local conditions. The terminal in American Samoa was initiated by their Educational Television activity. It flickered for a time, flamed up with increasingly important medical traffic, and then died. The value of two-way communication with Pacific nations for health, education, and community services did not impress the territory with one of the most famous television broadcast operations in the world.

In 1974 Dr. James Richstad, a member of the staff of the East-West Center Communication Institute, interviewed key personnel in American Samoa to get at causes. Richstad, a journalist-educator, talked with Dr. Peter Beales, then Director of Public Health, and Steve Eigsti, a television engineer. The contract period is completed for both, and they have since left Pago Pago. But at this writing the terminal has not been reactivated.

Beales: What we have is a conference room in here. When we first had this stuff in the education department, they would ring me up on Monday night. I would have to drive down from here to the education facility, and I would then spend an hour down there. Meanwhile, emergencies would occur in the hospital, and it was most unsatisfactory. So I had a phone patch put in (interconnection of telephone line to satellite Terminal) so at last I could phone patch through from here.

Richstad: Is that convenient?

Beales: Oh, yes, absolutely. Well, it's convenient for me, but it was very apparent that it was inconvenient for education. We phone down to the ground terminal and from there go to the terminal in Hawaii. Someone has to manipulate the gear so that we can have a two-way channel--that means he has to tie up his time. And, as I say, it seems to me that education has not said, "okay, we are responsible for PEACESAT, we have a man who's going to run it and when you need it, you may have it." We've never got that mandate from education at all.

Richstad: In fact, they don't want to sign to that, really.

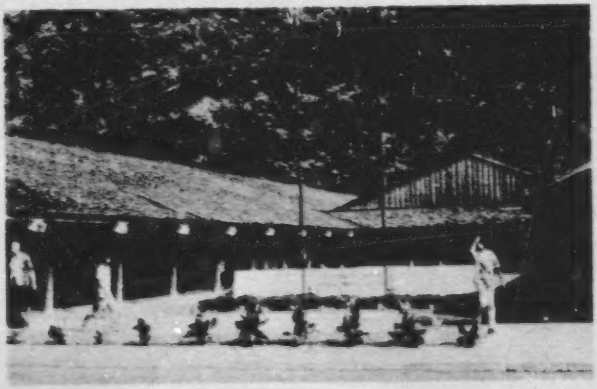
Beales: I found out by accident that we even had PEACESAT on the island. It was never told to me. But when I did find out we had it, then we used it. I have communications with Dr. Leon Rosen of NIH now. At the time that I needed it, when I did find that we had it, we had our epidemic of dengue fever. There would appear to be a dengue problem again this year.

Richstad: Apparently it is, and the people in the rest of the system say they would like American Samoa to be in it.

Beales: Absolutely, I would like to be able to communicate directly with South Pacific Commission with Dr. Loison there. The other thing is medical discussions, such as we have on our patients sent to Tripler Army Hospital (Honolulu). We have patients; we get them to a point of requiring further care, we send them to Tripler, and, basically, our doctors lose sight of them. It would help in the patient's treatment because they will be able to discuss with our doctors some of our findings down here and which would perhaps help in the treatment of the patient. We have VHF connection between our eight dispensaries and this hospital within the territory. What we need and what we are looking toward now in the next few months is purchasing an EKG machine, but we do not have a specialist to read it, and I would like to be able to transmit to Hawaii EEG recordings for interpretation.

Richstad: They're using it in Micronesia at a medical public health school.

Beales: My feeling is that there are a lot of things we could do if we had a reliable service, if the time were available, and if we could have a phone patch link in here and in my conference room where not one person but 10 or 15 people could listen to what's going on.



LBJ Medical Center, Pago Pago, American Samoa. June 1972.

Richstad: Do you see any potential uses--you already mentioned dengue fever--in the other parts of the Pacific, such as either Micronesia, Fiji, Tonga, or even Wellington, and Papua New Guinea?

Beales: Yes, particularly the South Pacific Commission, of course, takes the identification of the dengue outbreaks or any epidemic conglomorate. Yes, I understand that New Zealand has been putting on some conferences which have been going over our heads--we haven't been taking advantage of them simply because we do not have an established system. But, quite frankly, until the Office of Communications in this territory takes charge, I do not think that the facilities that are being provided by this PEACESAT communication will be readily made use of and readily available to every department.

Richstad: I think the point you made on reliability is important: you have to know what's going to be there when you want it. I ran into that problem in Honolulu: they've been having funding trouble, and you can't plan programs.

Beales: No, you can't.

Richstad: What would you get out of PEACESAT during an outbreak like dengue that would be very difficult under any other system? Is it important to get daily reports of where they're breaking out and that sort of thing, or what?

Beales: Any communicable disease like that, yes. In a case of hepatitis, not really except that it is rather interesting. It wasn't until I attended the Directors of Health conference about five months later in Noumea that we realized that the hepatitis outbreak that we had in American Samoa was not the only outbreak. Cook Islands and other territories had similar outbreaks, and we had no idea of it.

Richstad: Is there a general lack of communication, then, among medical people in the South Pacific?

Beales: Well, you know the reports take a month or two to get out. All of us send in our reports of notifiable diseases to the South Pacific Commission, and they compile them and send them back to us. So we do get a picture. But unless one can see a trend, obviously, it may not become apparent that everybody is getting an epidemic at the same time.

Richstad: One thing I'm particularly interested in (in social and political issues), is the ability through PEACESAT to ask questions. Now a report would come out saying there's an outbreak of so and so, but how important

is it to you as a doctor to be able to ask questions of people on the scene to get more information?

Beales: Oh, in the case of dengue, very important because we need to know whether they're getting any hemorrhagic cases of dengue, which is, of course, the killer type I mean dengue can take several forms--it can be a mild condition, it can be a severe condition, it can be a fatal condition. It's of value for us to know what kinds of reactions people are getting in the form of dengue that's going around.

Richstad: The kind of thing you could get using PEACESAT?

Beales: Yes, oh yes, you could get first hand information from a physician as to what are the symptoms, how is it presenting. And we can then be looking out for these cases because its very difficult to prove. You have a clinical case, you have a patient with symptoms that appears to be dengue, and there is no real treatment for dengue, it's all symptomatic. You take the serum at that time, and then about 2-3 weeks later you take another serum, and you send both these serums off together. It could be a month before you get a positive diagnosis to say "Yes, that was dengue," or "No, it wasn't." You don't know what you're dealing with in between, and so it is very helpful to know the exact kind of combination of symptoms that people in the neighboring territories are having, then you can really look out for it--the documentary cases.

Richstad: Those were the main areas I was interested in talking with you about.

* * * *

Richstad: Okay, this is very informal, too. What I'm doing saves me a lot of note-taking, too. People want to hear, so we may take part of it out and use it in the audiotape when we talk about PEACESAT.

Eigsti: Our head librarian, Mildred Council, who came down from Maui, asked me several times if we had an operation she could use in her library work, so maybe that's a new use we haven't had before.

Richstad: They've tested the library use, but I don't know how much they've done with it.

Eigsti: She has used it, I guess in the past where she was... Of course the doctors are probably the main use, and even if that were the only use I think it would justify it.

Richstad: We used it (Pacific Island News Association) twice here, I think, in a press conference. The people from

James Richstad, journalist-educator. Richstad used PEACESAT in support of early developments of the Pacific Island News Association. July 1975.

Western Samoa came over and participated in the same way that they're going to do next week.

Eigsti: I don't see why the Department of Education wouldn't have more use for it also if it were there. I think our biggest problem is we haven't had anybody really to manage it or operate it. The most time-consuming problem is when we get a caller who'd like to talk to so and so, and we have to figure out where is so and so, how can we reach him?

Richstad: Well, it very well goes beyond education, with the medical and other matters. Yet education would be probably the hardest user of it. It seems to be an intra-government kind of a situation. I hope it works.

Eigsti: I am sure people want it and it's so worthwhile. It's just we've got to decide for ourselves here who can be responsible, who has a place for him. In the Department of Education right here we have a serious space problem. Maybe the community college--we haven't discussed it yet with them--maybe they'll have a place.

Richstad: They're moving into the Mormon High School?

Eigsti: Yes, I don't know for sure what happens to their buildings here.

Richstad: I'm sure a lot of people have their eye on it.

Eigsti: We have good phone service between the new community college and the hospital. Down here that would alleviate some of that problem. ...I think to make it more reliable we should have a more powerful transmitter. That's something we would have to look into. Then the next step is to find a home for it, and then go on a little bit further and upgrade the equipment a little bit.

Richstad: That basically would be a few thousand dollars, or do you think it would be would be more?

Eigsti: I wouldn't think so.

Richstad: What we're trying to do is get from people who have used it and are close to it-what they think the system might do.

Eigsti: There are a lot of possibilities we have here in American Samoa. We are not utilizing PEACESAT anywhere near its potential. To just back up a little bit, the equipment that we have is the backup unit which is the standby within the basic system. It's only a 100-watt amplifier. So we sometimes have a problem getting into the satellite and the reliability is not really what it should be at this end. The equipment came down as part of an experiment, as I understand it, before I was associated with it here. And it came down into the Department of Education, and since they saw it had electronic parts in it, they sent it over to television engineering. We in television engineering have given it a temporary home for the past, almost two years now. The biggest problem and the most unfortunate thing is that we don't have anyone full-time or at least to give a good portion of time to act as a manager to make the contacts--do the footwork, arrange schedules and so on with people in various departments here on the Island. This seems to be one of the essential ingredients in the success of the PEACESAT terminal; having someone at this end, who has a little bit of vision about what it can do, to act as terminal manager or contact person for the area.

Richstad: Had American Samoa originated any programs through this system?

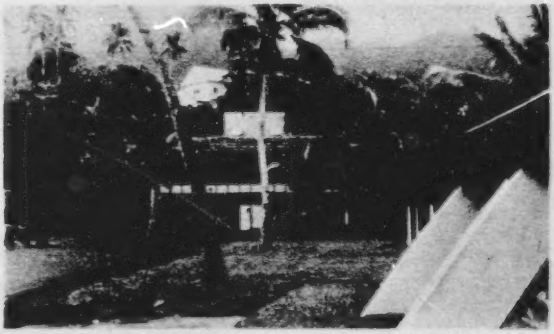
Eigsti: We've not really originated programs. Before I came, the hospital made use of it with the National Institute of Health for hepatitis epidemic on the Island. And since I've been here, the biggest and most enthusiastic user has been our hospital facility. The doctors there have realized the potentials of this satellite to consult with medical authorities. But I was hoping we could work on an arrangement where we can transmit x-rays using the satellite, including teletype data.

Richstad: From your knowledge of what's going on in American Samoa, what kinds of groups do you feel would be interested in using PEACESAT?

Eigsti: Well, judging from the past year or so, the hospital is very much interested in it. There is some interest, I think, among the various scatter people in the Department of Education, but they aren't really aware of it. There are quite a number of seminars that the Department of Agriculture could use.

We've been asked by Hawaii to have our Police Department and other law enforcement people become involved in it. Legislators have been interested in it. From time to time, we've had journalism conferences. We had the editor of the South Sea Star at Apia over here to use the satellite at one time and it really cut costs. I can see much use for it--for the Marine Resources Program that we have here working with biologists and botanists, or whatever at the University in that kind of a program, for instance. We have a program called the Hawaii Project, I believe. It's an early childhood type of schooling where they've built several kindergarten or grade schools on the island, and the attempt was to give the Samoan children an air-conditioned, real nice environment, and it's a federally-funded program. George Skipper is the local. And he was very much interested in using the satellite to transmit data back and forth between here and Hawaii, since the people in Hawaii and Guam apparently have a similar project going there. He was very much interested. In fact, he said he would commit a portion of money to support in this. So, there is interest there, and the main thing we need now is a good salesman to go door to door and see what kind of support we can give it. It's been my feeling that with the island being organized and arranged the way it is, the logical person to give it the impetus and a financial commitment would be the Governor or the Governor's office through some type of administrative assistant, something like this, appointed as a terminal manager. Then that person could make the contacts with the various department around the island. And I think it would have a great chance of success if it was operated this way rather than just the sole property of one department. A good place to house it, we feel down here, might be the community college, especially when the community college moves. Technically, it is a good location. The community college is a very natural location to house the equipment.

Richstad: Thank you, Steve.



American Samoa Educational Television Production Center, first location of the PEACESAT terminal, Pago Pago. May 1972.

USER GUIDELINES

James McMahon
PEACESAT Coordinator

One of the premises of the PEACESAT experiment is that we can learn from experience. The system serves as a test bed.

We might have been able to predict the communication event that James McMahon describes, but we could not have predicted the reaction or the number of such events. Nor could we have been able to enlist the attention of able people in the problem-solving exercise that followed.

In an international system, where terminals are licensed by a number of independent national Post and Telegraph Agencies, the rules of the road for use of the system become very important. Field experience has great value in developing procedures and patterns.

Committee Report

On June 28, 1972, the PEACESAT system was used for an educational discussion to focus on the effect of scheduled French nuclear testing in South Pacific waters on the environment. Local press attended the exchange. As the discussion progressed, it became apparent that some participants were trying to organize support for a Pacific-wide protest of the nuclear test activities.

Under a first-page banner, a headline news item, drawn from the exchange, appeared in the following morning's edition of The Honolulu Advertiser. PEACESAT terminal managers in Honolulu and Wellington agreed that the topic was not suited for an educational system such as PEACESAT and that no further exchanges involving these participants were to occur.

President Harlan Cleveland of the University of Hawaii expressed concern about the event. Policy or precedent regarding content of exchanges did not exist, however, revealing the need for guidelines on programming content. A committee was organized and chaired by James McMahon, PEACESAT System Coordinator. Membership consisted of:

Dr. Richard Barber, Assistant Director, Social Science Research Institute

Dr. Bonnie Wiley, Professor of Journalism

Dr. Richard Seymour, Chairman, European Languages Department

Dr. Geoffrey Kucera, Chairman, Educational Communication Department

Dr. Richard Sanderson, Media Specialist, Instructional Resources Center

Dr. John Bystrom, PEACESAT Project Director; Chairman User Guidelines Committee

Consultants included:

Carol Misko, Terminal Manager, Honolulu

Anthony Hanley, Terminal Manager, Wellington

Alan Cutting, Terminal Manager, Suva

The committee produced guidelines which were approved in final form March 1973 and subsequently served as a policy guideline for local terminals.

Suggestions for Content of Programming on PEACESAT System

The basic theme common to all governmental authorizations for PEACESAT operation is that of providing an educational service. Since PEACESAT broadcasts cover a wide geographic area, it is difficult to develop a definition of "educational services" that would (1) be susceptible to common interpretation by all users in their choice of program content, and (2) be acceptable to all users in terms of national sovereignty and national cultural sensitivity. In such a situation, the most feasible course of action is to repair to those general values that are universal and lend order and propriety to actions in all societies. The suggestions that follow were prepared with these considerations in mind. In addition, provisions are included that conform to generally accepted rules for all broadcast service.

1. The net will not be used to transmit or receive messages for hire, nor for communication for material compensation, direct or indirect, paid or promised.

2. The transmission of messages in codes or ciphers, to or between stations, is not authorized. All communications, regardless of type of emission employed, shall be in plain language except that generally recognized abbreviations established by regulation or custom and usage are permissible as are any other abbreviations or

PEACESAT System Coordinator, James P. McMahon. September 1972.

signals where the intent is not to obscure the meaning but only to facilitate communications.

3. Communications containing obscene, indecent, or profane words, language, or meaning will not be transmitted.

4. No station will transmit tendentious information or unidentified radio communications or signals.

5. The net will not be used to publicize or solicit support for political causes, either domestic or international.

6. Material that propagandizes ideas of war or racial hatred or is aimed at interference in another nation's internal affairs or foreign policy will be avoided.

7. Weekly programming discussions will be used to filter and identify those topics that fall within the categories enumerated above.

8. In the final analysis, each terminal can elect to cut off any broadcast that does not conform to local norms; i.e. nothing in these suggestions shall be interpreted as restricting the right of terminal managers to switch off broadcasts they consider in violation of local terminal rules on broadcast content.

Honolulu Advertiser
June 28, 1972

'Flotilla' Sails in Protest

Three protest ships are scheduled to set sail today from Wellington, New Zealand, into the French nuclear testing zone in the South Pacific.

The Advertiser learned of the protest move during an hour-long transpacific radio conversation last night over the University of Hawaii's PEACESAT communications system.

The system which links Hawaii with several major universities in the South Pacific, was used for a round-robin discussion among anti-nuclear test leaders in New Zealand, Fiji, and Hawaii.

Dr. Walter Johnson, University professor of history, represented Hawaii.

The major news development came fron New Zealand.

Dr. Barry Mitcalfe, chairman of the Peace Research Media Project in affiliation with the University of Wellington, disclosed the plans.

He said the three ships--one of 100 tons--would sail under legal permit from the New Zealand government. He said two members of New Zealand's parliament and one member of Fiji's parliament will be aboard.

Mitcalfe said that the French nuclear test is understood to be scheduled for July 3.

The French have kept their nuclear test dates a closely guarded secret. The only word they have released is that nuclear tests are "planned."

Amalia Rokopuicuna, an official of the YWCA in Suva, Fiji, reported via PEACESAT that efforts are also underway there to charter a ship and sail it into the test area.

Meanwhile, in Melbourne, UPI reported a twenty-four hour police guard was placed on the home of the French consul in South Paura following a death threat by an unknown caller.

PEACESAT CONSORTIUM

To facilitate cooperation in planning and experiments the PEACESAT Consortium was organized in April 1973.

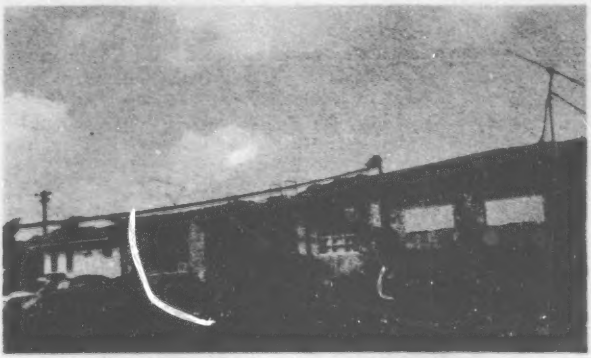
The University of Hawaii and Wellington Polytechnical were joined by the Trust Territory of the Pacific Islands, the South Pacific Commission, and the University of Technology, Papua New Guinea. The University of the South Pacific, the latest member, joined in June 1975.

Meetings are held using the satellite communication system. Pictured here are the New Zealand members of the Consortium Council at a recent Pacific-wide meeting (L to R) chaired by Martin Kimble, Chairman of the PEACESAT Consortium and Chairman of the Wellington Tertiary Education Consultative Committee; Anthony Hanley, Wellington Terminal Manager; and John Watson, Director, New Zealand Council for Educational Research.

Corinne Watanabe, Legal Counsel to the Consortium, is shown with John Bystrom, who serves as Executive Secretary. Geoffrey Ashton, Vice Chancellor, University of Hawaii at Manoa (not shown) is the Consortium Council member from Hawaii. The nonprofit Research Corporation of the University of Hawaii administers the program. April 19 1.

PROJECT CHRONOLOGY

1969	Project discussed with NASA. Planning began and inquiries sent to Pacific Universities from Hawaii.
1970	NASA approved use of the ATS-1 satellite.
1971	Pilot terminals established at Hilo and Honolulu in Hawaii with State and University funds. Early experiments included first class for credit and first library network by satellite. Wellington Polytechnic (N.Z.) and Hawaii started the first international educational network by satellite.
1972	Terminals activated at Suva, Fiji; Nuku'alofa, Kingdom of Tonga; Pago Pago, American Samoa; Lae, Papua New Guinea; and Maui, Hawaii. Experiments in regional and international networking began.
1973	Terminal activated at Saipan, Trust Territory of the Pacific Islands. International Consortium of educational institutions established for development of satellite communications. University of the South Pacific began Regional Education Network Experiment.
1974	Terminals activated at Island of Niue; Honiara, British Solomons, and Tarawa, Gilbert Islands by the University of the South Pacific; Port Moresby, Papua New Guinea; and Noumea, New Caledonia. South Pacific Commission began Regional News Experiment.
1975	Terminal activated at Port Vila, New Hebrides.



Site of PEACESAT Terminal in Saipan, Trust Territory of the Pacific Islands. April 1973.

Participating Institutions: University of Hawaii, Honolulu, Hawaii; Wellington Polytechnic Institute, Wellington, New Zealand; University of the South Pacific, Suva, Fiji; USP Centre, Kingdom of Tonga; University of Technology, Lae, Papua New Guinea; Office of the High Commissioner (Broadcast Division), Saipan, Trust Territory; South Pacific Commission, Noumea, New Caledonia; Scientific Research Department, Rarotonga, Cook Islands; Education Department, Niue; National Broadcasting Commission, Boroko, Papua New Guinea; USP Centre, Honiara, Solomon Islands; USP Centre, Tarawa, Gilbert Islands; USP Centre and Kawenu Training College, Port Vila, New Hebrides.

STAFF

Terminal staffs: MOSTYN HABU, Honiara, Solomon Islands · STEVE SEUMAHU, IAN FLETCHER, Lae, Papua New Guinea · RODNEY SPOONER, Alofi, Niue · PAT MAHONY, Noumea, New Caledonia · COLEMAN MONI, Port Moresby, Papua New Guinea · ROSLYNE PEDRO, Port Vila, New Hebrides · STUART KINGAN, TEREAPII KINGAN, Rarotonga, Cook Islands · GEORGE CALLISON, ELIAS THOMAS, Saipan, Trust Territory of the Pacific Islands · GILDA BENSTEAD, PETER MCMECHAN, Suva, Fiji · TEMAROITI RAMETI, Tarawa, Gilbert Islands · ANTHONY HANLEY, ELSA FLAVELL, Wellington, New Zealand · KAVEINGA HAVEA, 'ANAU FANUA, Nuku'alofa, Tonga · WALTER OUYE, Maui, Hawaii CAROL MISKO, Honolulu, Hawaii · KATASHI NOSE, Technical Consultant, Honolulu, Hawaii.

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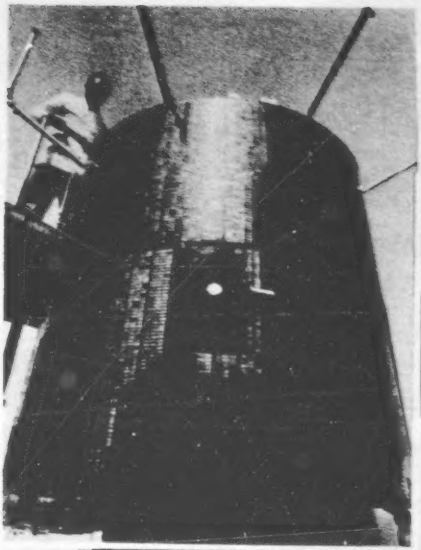

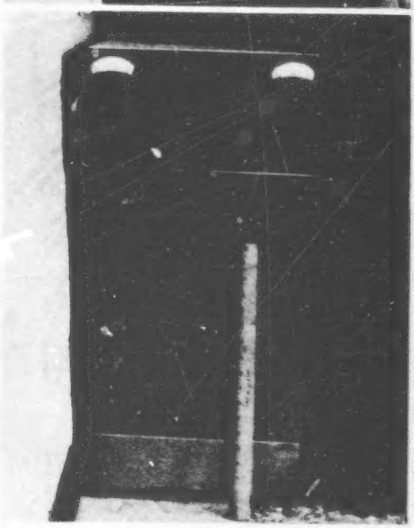

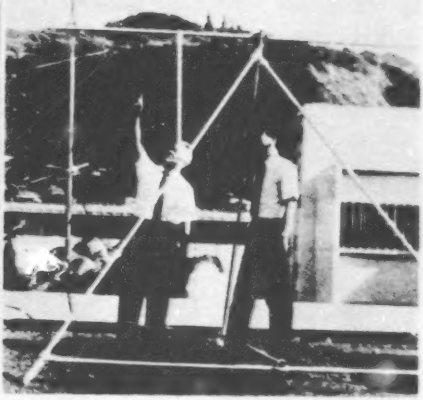

The key to the PEACESAT experimental system is a small ground terminal. The cost averages $5000 per unit. It is moveable and provides two-way communication for small amounts of traffic. Ground terminals constructed for the heavy commercial traffic of urban centers, with their large antennas and enormous capacity, cost 1000 times that amount. The antenna for the small terminal shown with Professors Paul Yuen and Katashi Nose (left) can be disassembled and moved. The exchange center shown occupied a space 15 ft. by 12 ft. Pictured also is the ATS-1, an experimental weather satellite, which NASA launched in 1966 at the cost of $7.5 million.